The Economic Impact of Right to Work Policy in West Virginia

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This report was updated in March 2016 to correct an error regarding the enactment date of right-to-work laws in Utah and Texas. The correct dates have been used in all calculations in this report.

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Executive Summary

In this report we examine the way in which Right to Work (RTW) policy has affected economic outcomes across US states and we consider how the adoption of such a policy in West Virginia would likely affect economic outcomes in the state. We begin with a simple presentation of various economic outcome measures for states that have RTW policies in place versus states that have not adopted such policies. Highlights of this section of the report are as follows:

- Over the period 1983 through 2014, union membership was consistently lower in RTW states compared with non-RTW states.
- Employment has grown more rapidly in RTW states compared with non-RTW states. Overall, employment grew by a factor of 4.6 in RTW states between 1950 and 2014, well above a factor of 2.8 in non-RTW states.
- Gross Domestic Product in RTW states grew faster between 1963 and 2013 compared with non-RTW states. GDP grew by a factor of 6.5 in those states with RTW laws in place, compared with 4.9 in non-RTW states.
- Annual wage and salary rates were significantly lower in RTW states compared with non-RTW states between 1969 and 2013.
- Employment growth in the manufacturing, construction, and mining sectors specifically has been stronger in RTW states compared with non-RTW states over the last five decades.

While the simple examination of economic outcomes across the two groups of states is important in allowing us to understand our data and in the process of hypothesis formation, this superficial examination does not imply that RTW policy has caused the observed differences in economic outcomes. Instead, RTW policy may be correlated with other factors that could also influence economic outcomes, including other economic policies or factors as simple as climate.

A key benefit of our approach is that we provide a more rigorous examination of the way in which RTW drives economic outcomes by controlling for a wide array of state-level policies and characteristics that may correlate with RTW and that may also influence economic outcomes. This careful approach allows us to arrive at a much more reliable estimate of the specific causal effect of RTW policy on state economic outcomes. Highlight of this section of the report are as follows:

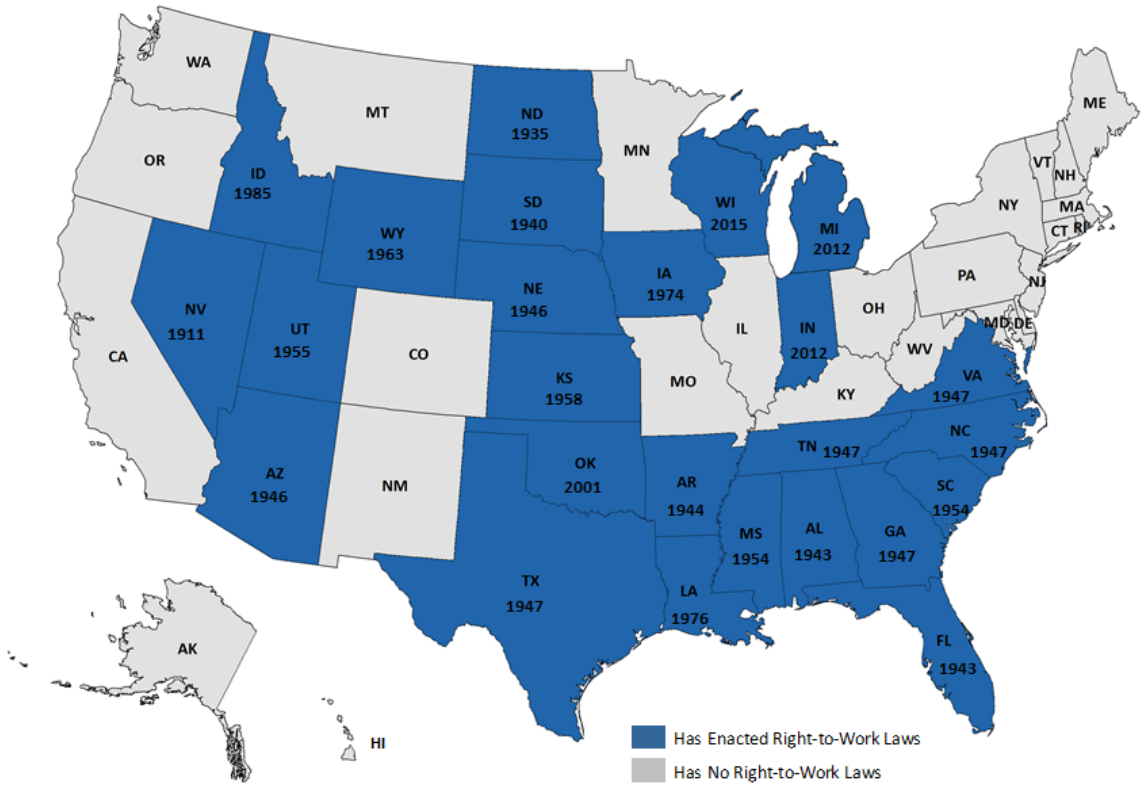
- We estimate that RTW policy leads to a reduction in the state-level rate of private-sector union membership of around 2 percentage points in the long-run. In other words, the rate of union membership is estimated to fall by around one-fifth as the result of the adoption of a RTW policy (based on an average rate of private-sector union membership of 11 percent over our entire 1990-2010 dataset).
- We estimate that RTW policy leads to long-run rates of employment growth that are around 0.6 percentage points higher than in non-RTW states.
- We estimate that RTW policy leads to long-run rates of GDP growth that are around 0.7 percentage points higher than in non-RTW states.
- Our results fail to identify a statistically reliable relationship between RTW policy and the rate of change in real wage and salary rates.

We close with a consideration of how the adoption of RTW policy would likely affect economic outcomes in West Virginia. No factors were identified that would lead one to doubt that RTW policy would generate similar economic effects in West Virginia compared with what has been realized in other states over the past two decades or so. Ultimately these results lead to the conclusion that the adoption of RTW policy in West Virginia would significantly reduce union membership in the state, and would substantially boost overall employment and output growth in the long-run.

1 Introduction

In recent years, policy makers in West Virginia have expressed interest in Right to Work (RTW) policy. Such a law would prevent unions at companies covered by collective bargaining contracts from requiring workers to pay union dues as a condition of employment. If West Virginia were to pass RTW legislation, it would become the 26th state to do so, adding to a recent increase in the number of RTW states.

Figure 1: Right to Work Policy among U.S. States



Sources: National Right to Work Laws, Legal Defense Foundation and Collins, Benjamin. "Right to Work Laws: Legislative Background and Empirical Research." Congressional Research Service. Jan. 6, 2014.

Right to work laws came about as part of the Taft Hartley Act of 1947, which amended the National Labor Relations Act of 1935, also known as the Wagner Act. The Taft Hartley law banned so-called "closed shop" contracts that required workers to be a member of a union before becoming employed at companies covered by collective bargaining contracts. However, Taft Hartley left in place other possible arrangements that could require workers to join a union, or pay union dues at unionized workplaces.

But the act also allowed states to enact laws preventing such agreements, laws that have become known as Right to Work laws. The nation's first RTW law was adopted in Nevada in 1911, prior to the Wagner Act. After adoption of the Taft Hartley Act, a broad wave of states followed suit during the 1940s and 1950s; and a few additional states adopted such policies over the next 40 years. After a lull of around a decade, three states – Indiana and Michigan in 2012, followed by Wisconsin in 2015 – also adopted RTW laws.

In this report we examine the potential economic implications of passing a RTW law in West Virginia. We do not evaluate the merits or costs of RTW policy from a philosophical point of view. Instead, we provide a broad examination of the way in which RTW laws have affected economic outcomes in US states during the period 1990 through 2012. In particular, we estimate the effect of RTW policy on state-level union membership, employment growth, output growth, and wage growth.

Because RTW legislation has been heavily politicized over time, much of the prior research on the topic has been conducted by advocates on either side of the issue. Advocates both for and against RTW legislation have made a number of arguments regarding these laws, which we have summarized below:

Proponents of RTW Policy	**Opponents of RTW Policy**
• RTW laws promote economic freedom because they enable workers to choose whether to join a union in a unionized workplace. • RTW laws remove barriers to labor mobility and thereby enhance economic efficiency. • RTW laws boost labor force participation. • RTW laws lower the cost of doing business and increase productivity. • RTW laws make a state more attractive to potential businesses. • RTW laws ultimately lead to more rapid employment and output growth and higher levels of economic prosperity.	• RTW laws lower union membership and erode overall labor influence. • RTW laws allow non-union members to receive the benefits of the bargaining efforts of unions and thereby "free ride" on union members in unionized workplaces. • RTW laws reduce wage rates. • RTW laws increase income inequality. • RTW laws reduce middle-class spending power, and diminish overall economic activity in states. • RTW laws violate economic freedom because they invalidate a collective bargaining agreement that was negotiated within the private sector.

Some proponents of RTW policy simply compare employment or output growth for RTW states to that of non-RTW states and find faster rates of growth in the RTW states. However, this superficial examination does not imply that RTW policy has caused these faster rates of economic growth. Instead, RTW policy may be correlated with other factors that could also influence economic growth, including other economic policies or factors as simple as climate. A key benefit of our approach is that we provide a far more rigorous examination of the way in which RTW drives economic outcomes, controlling for a wide array of state-level policies and characteristics that may correlate with RTW and that may also influence economic outcomes. This more careful approach allows us to arrive at a much more reliable estimate of the specific causal effect of RTW policy on state economic outcomes.

Our research is organized as follows: We begin with a brief review of the existing literature on RTW policy in Section 2. In Section 3 we provide a broad and cursory examination of economic outcomes for RTW states versus non-RTW states. While this examination does not indicate whether RTW policy is effective in causing changes in economic outcomes, it is important to provide context for our primary hypothesis testing and to understand the nature of our data. In Section 4 we provide our full statistical analysis to isolate the independent effect of RTW policy on state macroeconomic outcomes based on data from all US states for the years 1990 through 2012. In Section 5 we apply the results from the previous section to West Virginia specifically to consider how the adoption of RTW policy in the state will likely affect employment and output growth in the state in the long-run.

2 Literature

The impact of RTW policy on economic outcomes has been studied extensively in the economics literature. Much of the academic literature was published in the 1980s and 1990s and there has been less formal research on the topic in recent years. Many of the studies published in the last decade have been from advocacy organizations and thus have not appeared in academic outlets. This does not necessarily mean the research is faulty, but it does tend to reflect the point of view of the organization publishing the research. Moore (1998) provides a broad review of the academic research on the topic prior to 1998. We have also reviewed a variety of non-academic literature on the subject. Both the academic and non-academic studies have come to mixed conclusions about the impact of laws on various economic indicators. Here we focus on the available literature's results regarding three specific economic outcomes: unionization rates, wage rates, and employment and industrial growth.

2.1 Unionization Rates

One of the most common impacts examined in the literature is the effect of RTW policy on unionization. In his survey of the literature, Moore (1998) wrote that much of the literature has shown that RTW laws are associated with declines in union membership. However, Moore cautions that high preexisting rates of unionization can reduce the possibility that a state adopts RTW laws. Moore wrote that research accounting for this potential of reverse causation found little impact on unionization from RTW laws. However, in general, Moore concluded that RTW laws do reduce unionization through a number of channels, including difficulties in union organizing and free-riding among non-union workers in unionized workplaces. In a more recent study of RTW's effect on unionization, Eren and Ozbeklik (2015) examined the impact of Oklahoma's adoption of RTW in 2001. The authors estimate that private-sector union membership was approximately one percentage point lower in Oklahoma in 2007 than it would have been if the state had not adopted RTW when it did.

2.2 Wage and Salary Rates

As Reed (2003) points out, the potential effect of right to work laws on wages is not obvious. RTW laws can affect wages through a number of different channels, none of which point directly to a wage increase or decrease. For example, RTW laws have the potential to weaken the bargaining power of

unions, as members are no longer required to pay dues. However, this could lead unions to bargain more forcefully in order to indicate to members that they are working on their behalf and thus worth becoming dues-paying members.

Moore (1998) wrote that there is conflicting evidence on the effect of RTW laws on wages. In general, Moore concluded that the empirical evidence shows that RTW laws have little to no effect on wages for union or non-union workers. However, Reed (2003) estimates the impact of RTW laws on the average per-employee wage in the year 2000, conditional on the state's per-capita personal income (among other variables) in 1945, prior to the when Taft-Hartley amendments were passed. He found that RTW laws were associated with a 6.7 percent increase in per-worker wages relative to where they would have been without RTW.

Shierholz and Gould (2011) examine the impact of RTW legislation on wages and found that compensation among non-unionized workers was three percent lower in RTW states than in states with no RTW law. The report used individual worker data from the US Census Bureau and controlled for a variety of demographic and economic factors. Sherk (2015) criticized the Shierholz study in testimony before the Wisconsin Senate during that state's consideration of a RTW law in 2015. Sherk pointed to several methodological choices in the Shierholz study that he said had the effect of inflating the impact on wages. However, Gould and Kimball (2015) responded to Sherk's critique with an update to the original Shierholz study, and found a similar effect of RTW laws on wages as the previous study.

Two other recent papers use similar methodologies to examine the impact of RTW laws. Hicks (2012) examined the impact of right to work on the share of income in manufacturing industries and found little impact. Hicks and LaFaive (2013), a more comprehensive study, investigated RTW's influence on population and personal income and found RTW laws increase overall wage and population growth.

2.3 Employment and Output Growth

Employment growth is inherently tied to business formation and industrial composition. Most studies do not directly address the implications of RTW laws on employment as it can be difficult to determine whether RTW laws cause employment growth or whether that growth is related to other factors. However, several studies have examined whether states with RTW laws have greater levels of manufacturing. Holmes (1998), for example, used RTW laws as a measure of whether a state is more

pro-business than other states. Using county-level data, he found that there is a large change in manufacturing activity in counties in RTW states relative to nearby counties across the state border in non-RTW states. Kalenkoski and Lacombe (2006) examine a similar impact of RTW laws on the share of manufacturing employment in counties on both sides of the state's border. The authors specify a model that accounts for spatial dependence among the counties, meaning that counties close to each other are likely to be more similar compared with those that are farther away. The authors found that RTW legislation increases the manufacturing share by approximately 2 percent, which was lower than other studies that do not account for spatial dependence.

Stevans (2009) examine the effect of RTW laws on a variety of economic indicators, including firm births, bankruptcies, gross state product (GSP), per-capita personal income, and real wages. Importantly, this study accounted for the potential that the establishment of right to work laws in certain states may be caused by other factors in that state – particularly high levels of union membership – which raises the potential for reverse causation. Thus right to work laws are determined endogenously with other factors, and this endogeneity needs to be addressed in the analysis. After controlling for this endogeneity, Stevans found that RTW laws have little impact on employment and economic growth, but do have a significant negative effect on wages and total personal income. Lastly, in a forthcoming paper, Hicks, LaFaive, and Devaraj (2015) show that firm-level productivity is higher in states with RTW laws, which can influence firm location decisions.

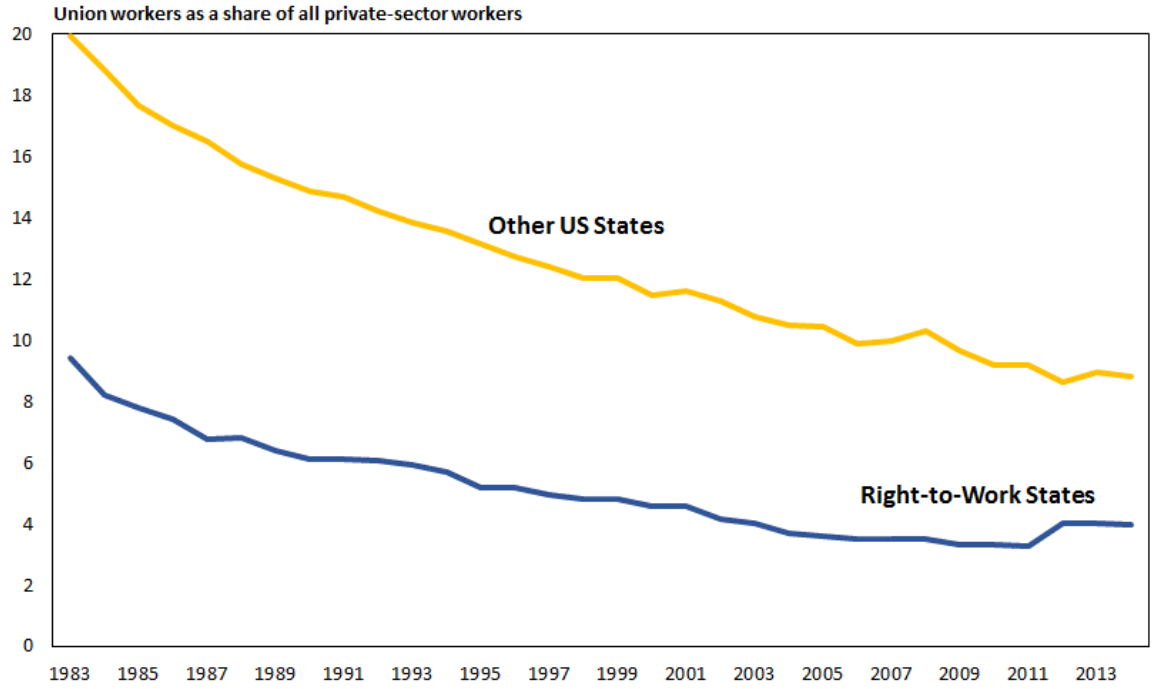
3 Data Overview

3.1 Union Membership

In this section we provide an examination of unionization and macroeconomic trends in states that have Right to Work (RTW) laws in place versus in states without such laws. Naturally, we begin with a consideration of union membership since union membership is the primary mechanism through which RTW laws affect broader economic outcomes. Given the basic nature of RTW policy, it is reasonable to believe that RTW states may experience lower rates of union membership. In Figure 2,[1] we report overall union membership as a share of the total private sector workforce for RTW states versus non-RTW states for the past three decades. As illustrated, union membership in the private sector is substantially lower throughout the period of analysis in RTW states. Indeed, union membership in non-RTW states is consistently around double that of RTW states. Also note, however, the overall trend of declining union membership in both groups of states. Indeed, the private-sector union membership rate has fallen by roughly half for both groups over the years, falling to 4 percent from nearly 10 percent in RTW states and to nearly 9 percent from 20 percent in non-RTW states.

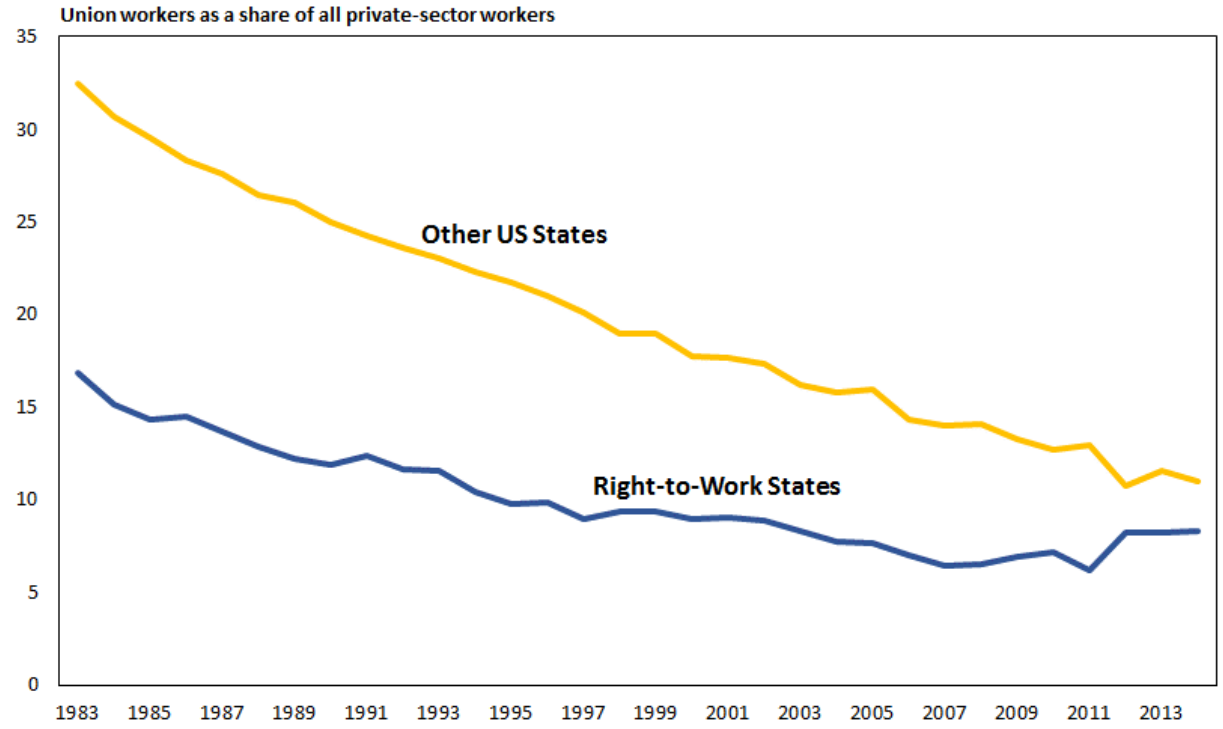
[1] Data sources for the figures in Section 3 can be found in the Appendix. In all figures, RTW states include only states that had a RTW policy in place during the given year.

Figure 2: Union Membership, All Private-Sector Industries



In Figures 3 and 4 we consider union membership in two specific industrial sectors that have a relatively high concentration of union membership and a historic reputation of union activity – manufacturing and construction.[2] The general patterns of lower rates of union membership in RTW states and an overall decline in union membership over time depicted in Figure 2 also exist for both of these specific sectors. In 1983, manufacturing-sector union membership was nearly double in non-RTW states compared with RTW states, however the two comparison groups have moved toward convergence over time. By 2014, manufacturing-sector union membership was 11 percent in non-RTW states and around 8 percent in RTW states.

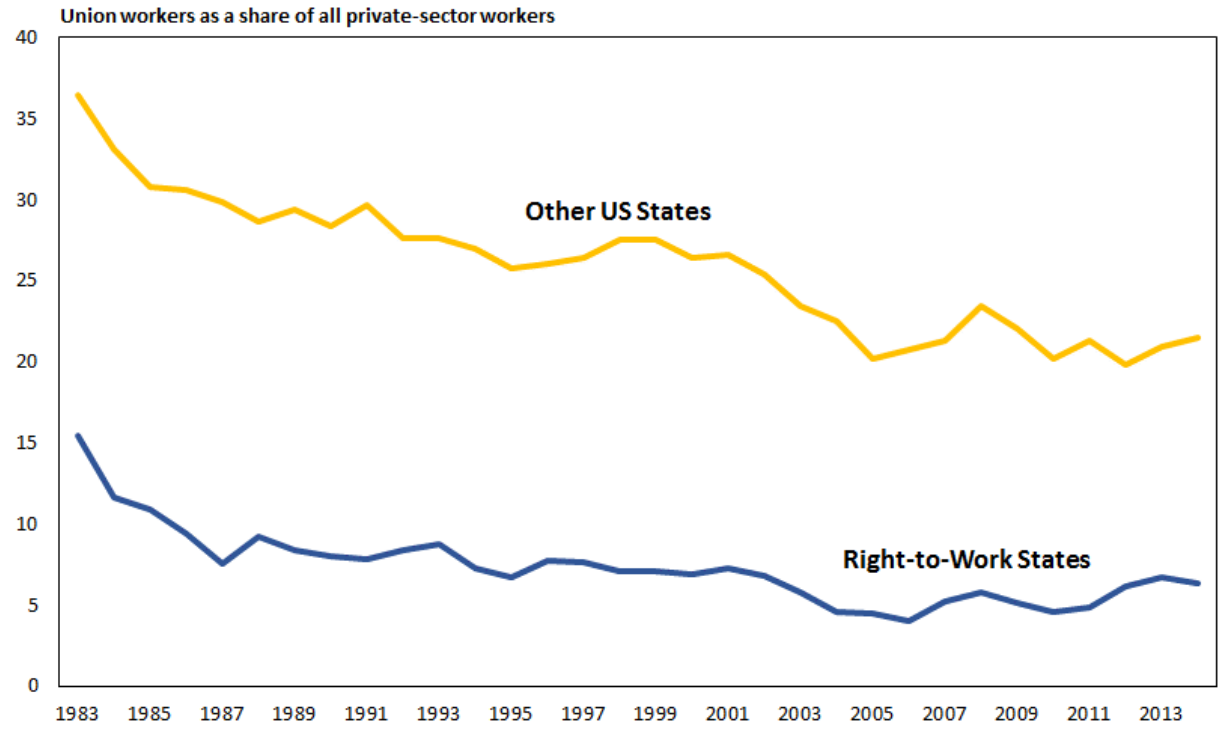
Figure 3: Union Membership, Manufacturing Sector



[2] Data relating to sector-specific union membership are not available for the mining sector.

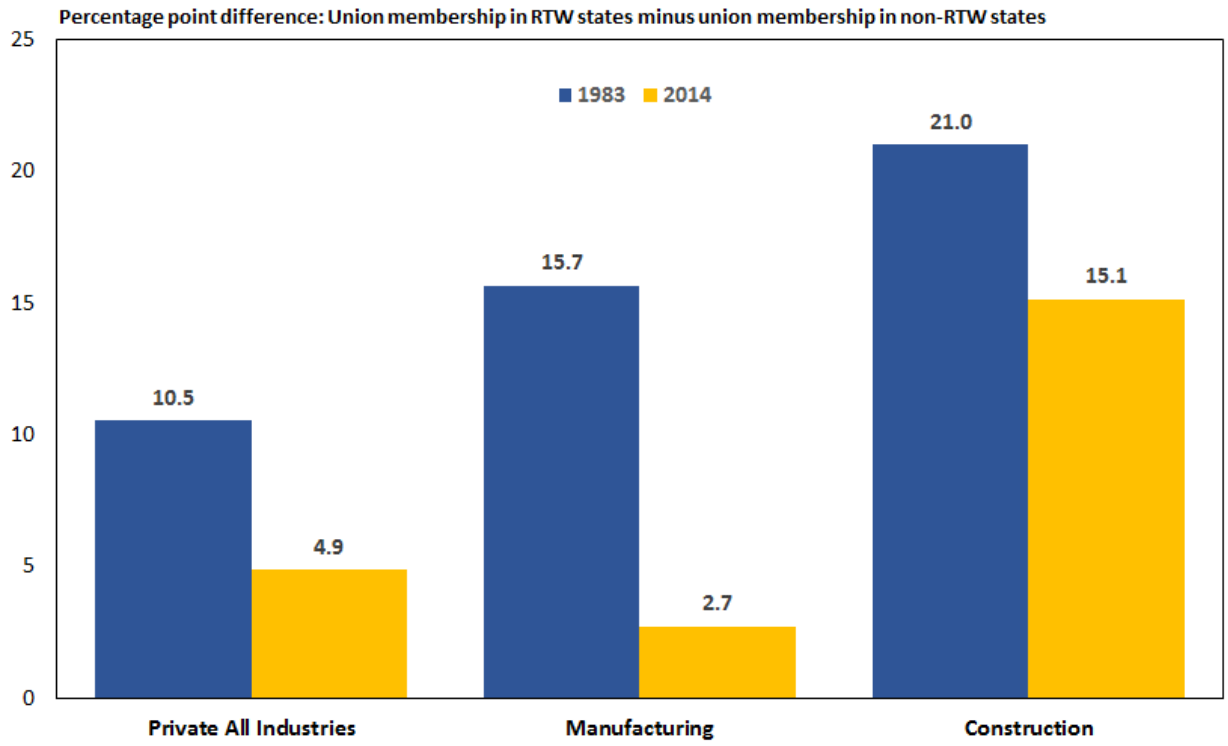
As illustrated in Figure 4, the differential in union membership between RTW states and non-RTW states is more pronounced in the construction sector, and here we see a much smaller decline in unionization over time. For 2014, construction-sector union membership stood at over 21 percent in non-RTW states and around 6 percent in RTW states.

Figure 4: Union Membership, Construction-Sector



In Figure 5 we take an alternative approach to depict union membership by illustrating the percentage point differential in union membership between our two groups of states for the first and last years of our analysis. As illustrated, the differential has declined in all private sector industries, as well as in manufacturing and construction specifically. The differential has become very small in manufacturing – just under 3 percentage points in 2014, but is still relatively large in construction – over 15 percentage points.

Figure 5: Union Membership Differential, Right-to-Work States versus Other States

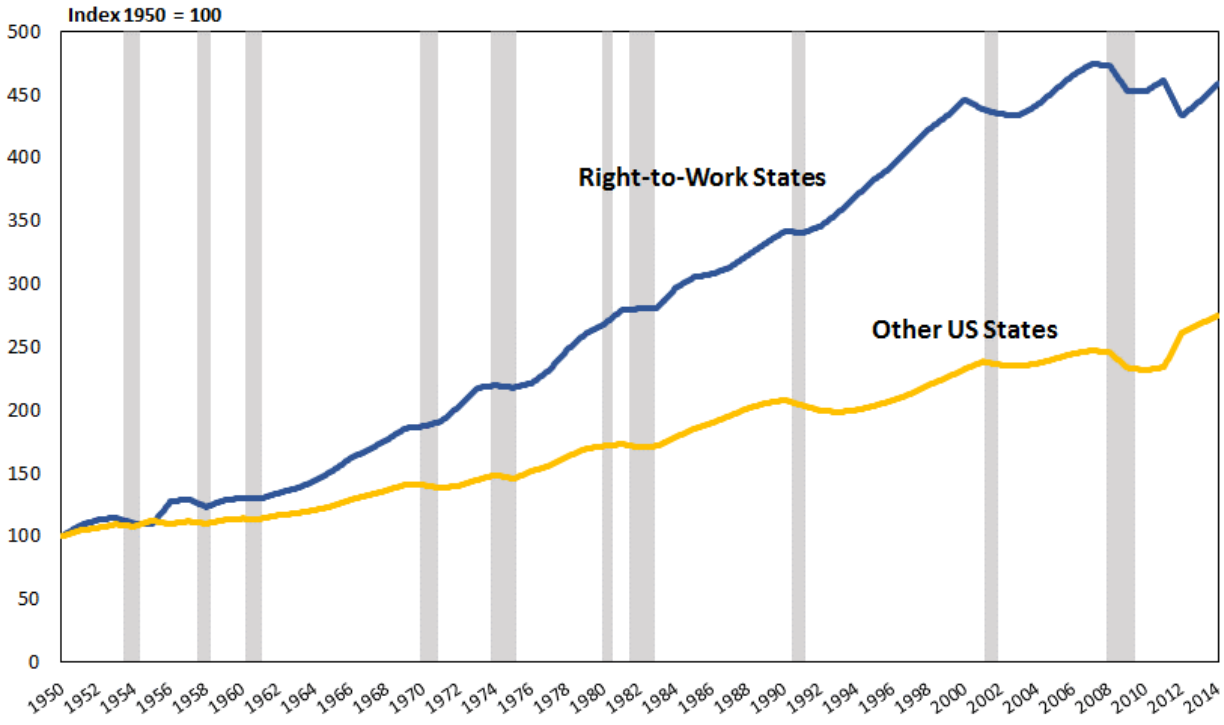


It should be noted, however, that thus far it is unclear to what extent RTW policy has actually led to the difference in union membership that is depicted in these figures. It is reasonable to expect that reductions in union membership are actually caused by the adoption of RTW legislation, but it could also be the case that states that have less union membership initially are more inclined to adopt RTW legislation. It is impossible to discern the relative contribution of these two alternate hypothesis to the outcomes depicted above in this cursory data overview. However, our richer econometric analysis below will shed more light on the issue.

3.2 Macroeconomic Outcomes

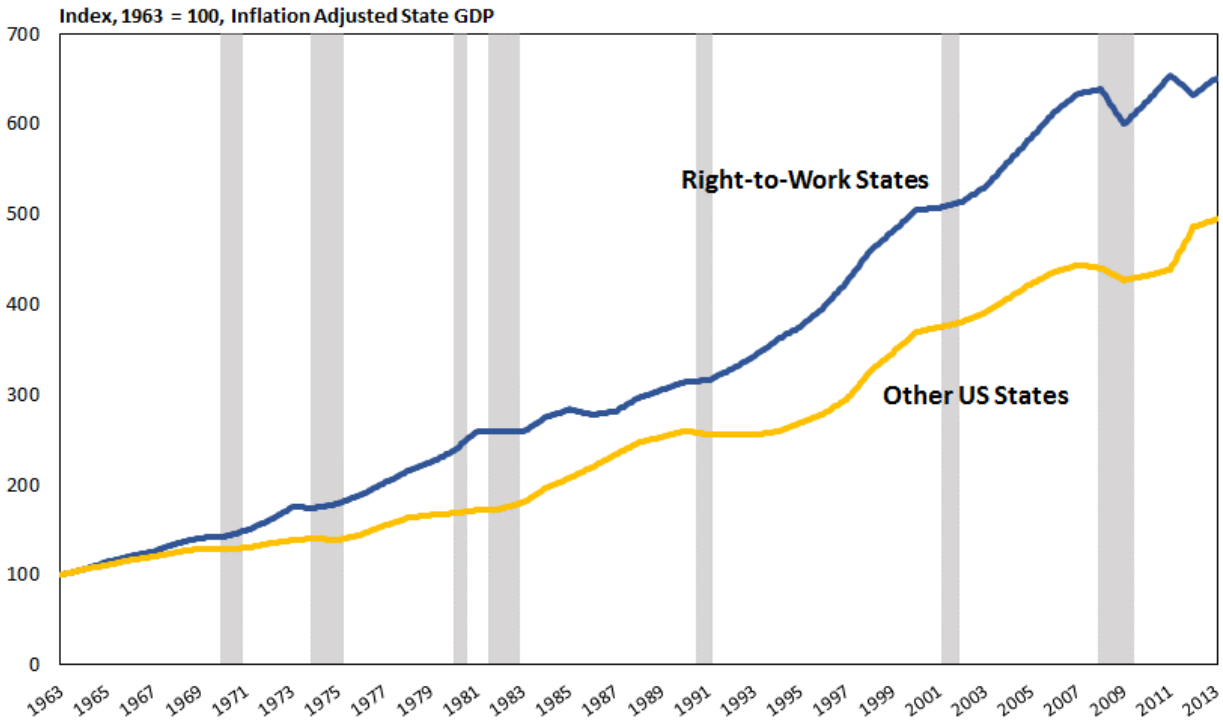
Next we turn to an examination of broader economic outcomes between RTW states and non-RTW states. Beginning with Figure 6, we examine overall employment in the two groups of states. Here we use an indexed approach where we show the overall employment level in a given year relative to the level in the initial year depicted in each figure. As illustrated, total employment has grown far more rapidly in RTW states through the period of analysis. Overall, employment in RTW states grew by a factor of 4.6, well above the rate of growth experienced by non-RTW states, where employment grew by a factor of just 2.8 over this 64-year window.

Figure 6: Total Employment



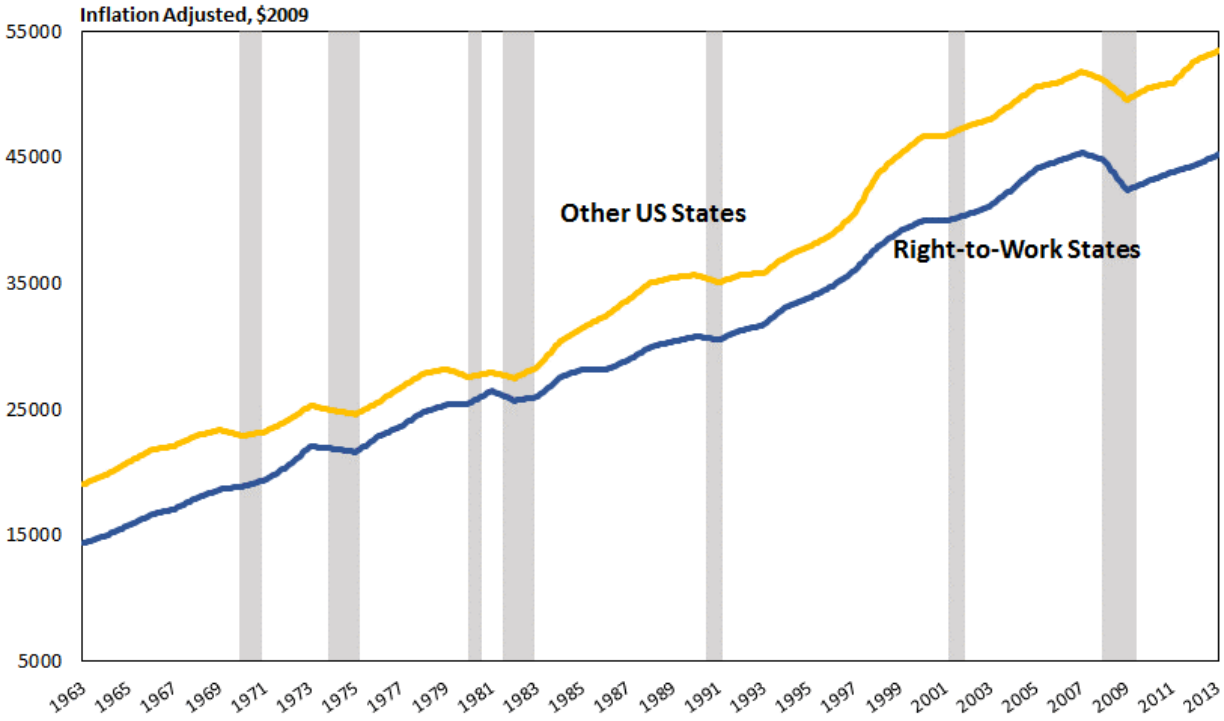
Similarly, in Figure 7 we report total economic output in the two groups of states as measured by state Gross Domestic Product (GDP). Here the differential in output growth is large as well: inflation adjusted GDP grew by a factor of 6.5 in RTW states versus 4.9 in non-RTW states.

Figure 7: Total State Gross Domestic Product



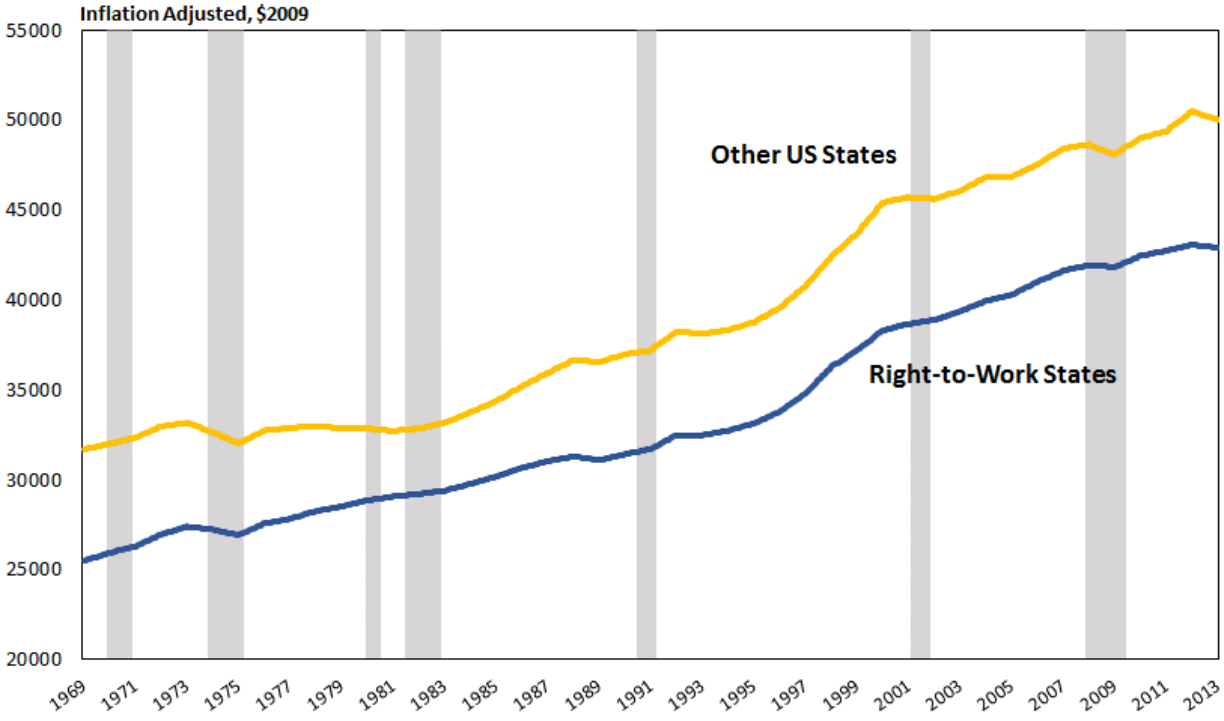
In Figure 8 we examine GDP on a per capita basis. Here we observe that the RTW states tend to have lower output on a per capita basis, compared with non-RTW states. The degree to which RTW states have lagged non-RTW states has narrowed over time: GDP per capita in RTW states stood at around 75 percent of that in non-RTW states in 1963. By 2013 GDP per capita in RTW states was about 84 percent of that in non-RTW states, a gain of 9 percentage points.

Figure 8: Gross Domestic Product per Capita



We also consider how annual wages and salary income per job compares across the two groups of states. As illustrated in Figure 9, this metric also follows a similar pattern to overall economic output in that the RTW states have lagged the non-RTW states in terms of wage and salary rates over the period of analysis. However, also in a similar pattern to GDP per capita, the gap in wages and salary rates between the two groups of states has diminished over the period of analysis. Wages and salary rates for RTW states were 20 percent below those in non-RTW states in 1969. The differential narrowed up through 1982, when wages and salary rates in RTW states were about 11 percent below those in non-RTW states. However, this differential has increased slightly since, with wages in RTW states falling to 14 percent below those of non-RTW states in 2013.

Figure 9: Annual Wage and Salary Income per Job



3.3 Sector-Specific Macroeconomic Outcomes

Beginning with Figure 10, we examine macroeconomic outcomes for specific industrial sectors for which RTW policy likely has the most direct effect. In this figure we depict manufacturing employment for the two groups of states over the long run. As illustrated, overall manufacturing employment has been considerably stronger for RTW states. In a related vein, in Figure 11 we report manufacturing employment as a share of total employment for the two groups of states. As illustrated, the decline in the manufacturing share of overall employment is bigger in the non-RTW states than RTW states. This is despite the fact that manufacturing employment has fared better in RTW states. Overall, the manufacturing employment share fell below 10 percent for both RTW and non-RTW states over the long run from around 35 percent in non-RTW states and nearly 27 percent in RTW states.

Figure 10: Manufacturing Sector Employment

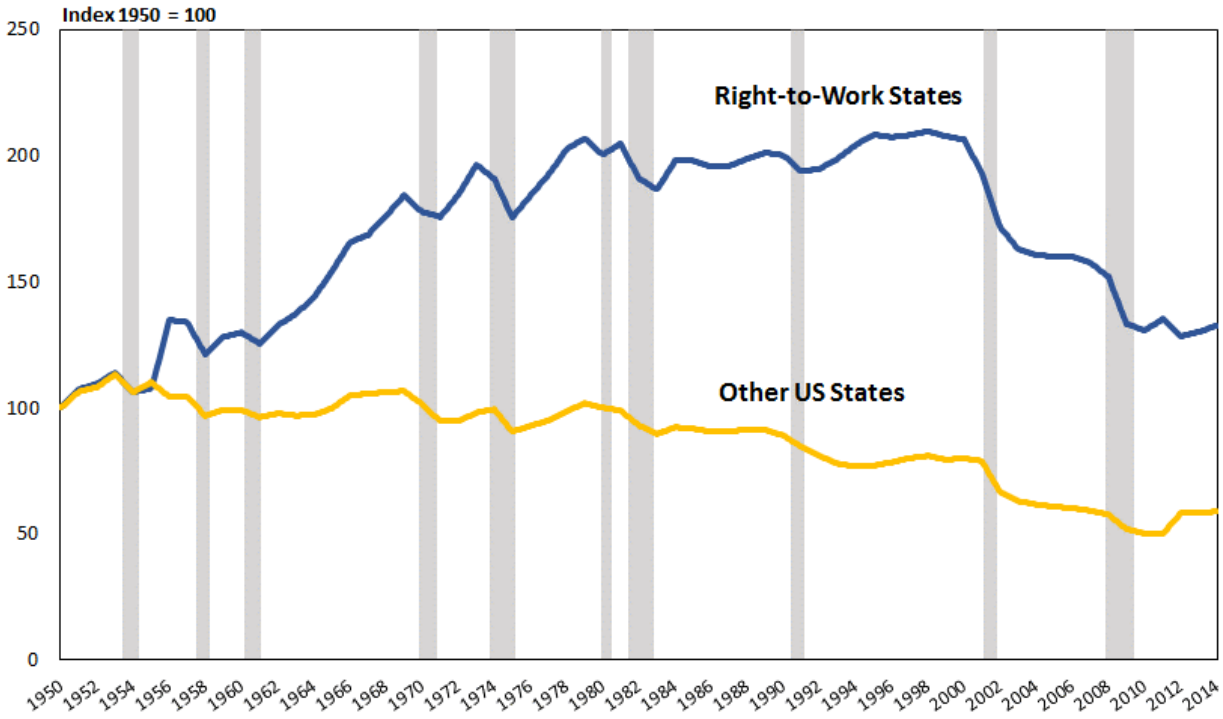
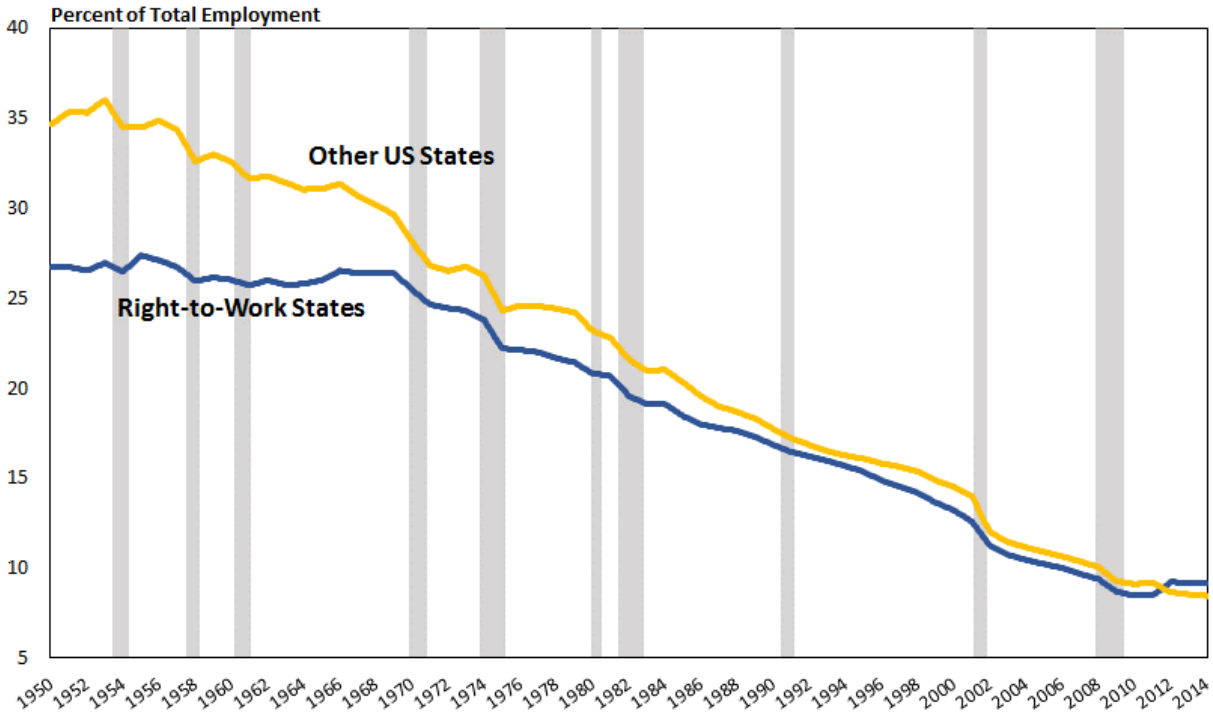


Figure 11: Manufacturing Share of Total Employment



In Figure 12 we examine wage and salary rates in the manufacturing sector for the two groups of states. Here we find a similar pattern to that depicted in Figure 9, in which wages and salary rates tends to be higher in non-RTW states. In manufacturing, the wage and salary gap was wider at the beginning of the period, but has narrowed considerably compared with overall wages and salary income. As depicted in Figure 13, wage and salary rates in RTW states stood at around 77 percent of such rates in non-RTW states at the beginning of the period of analysis, but that figure has improved in a relatively steady fashion over the long run, closing to a gap of around 88 percent by 2013.

Figure 12: Annual Wage and Salary Income per Job, Manufacturing Sector

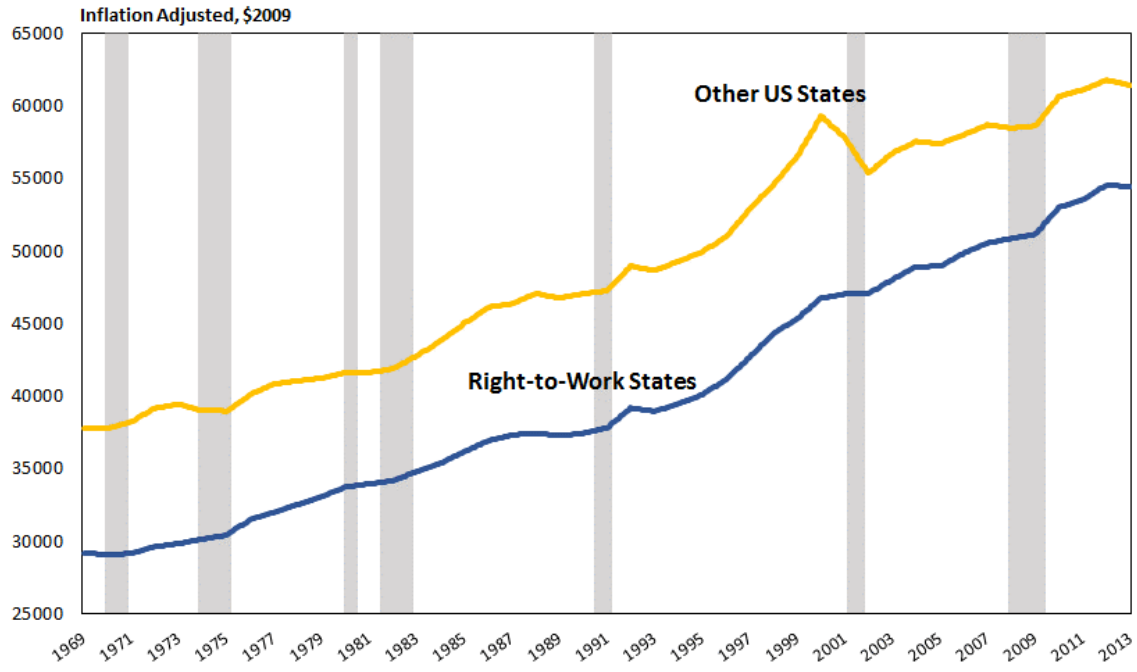
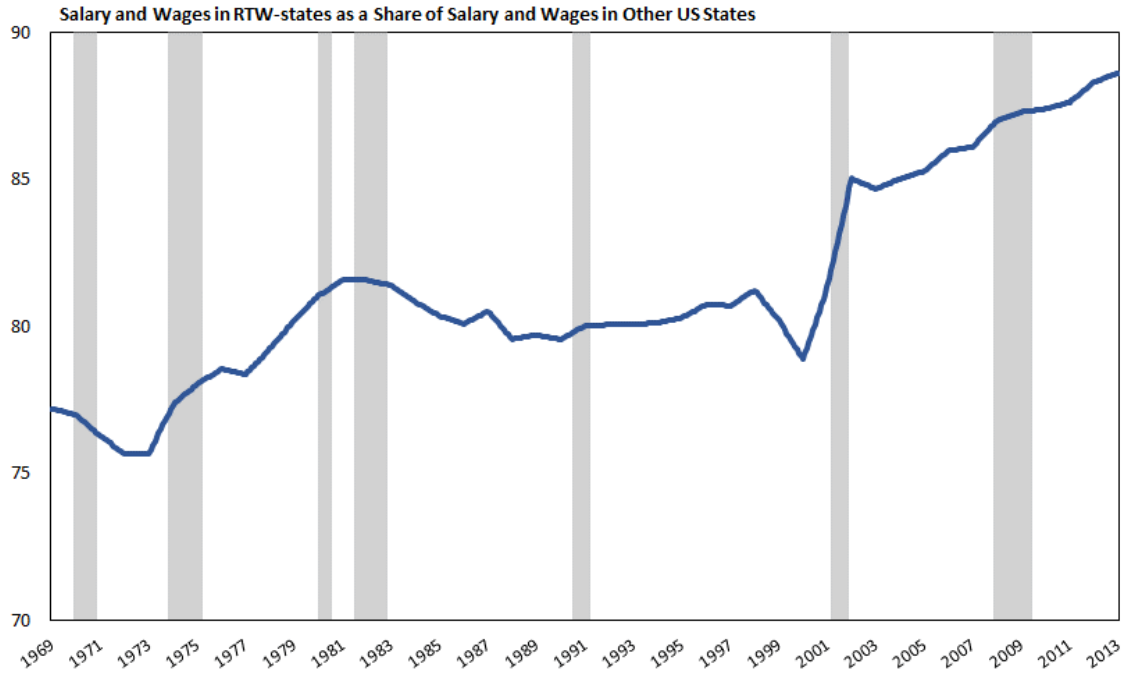
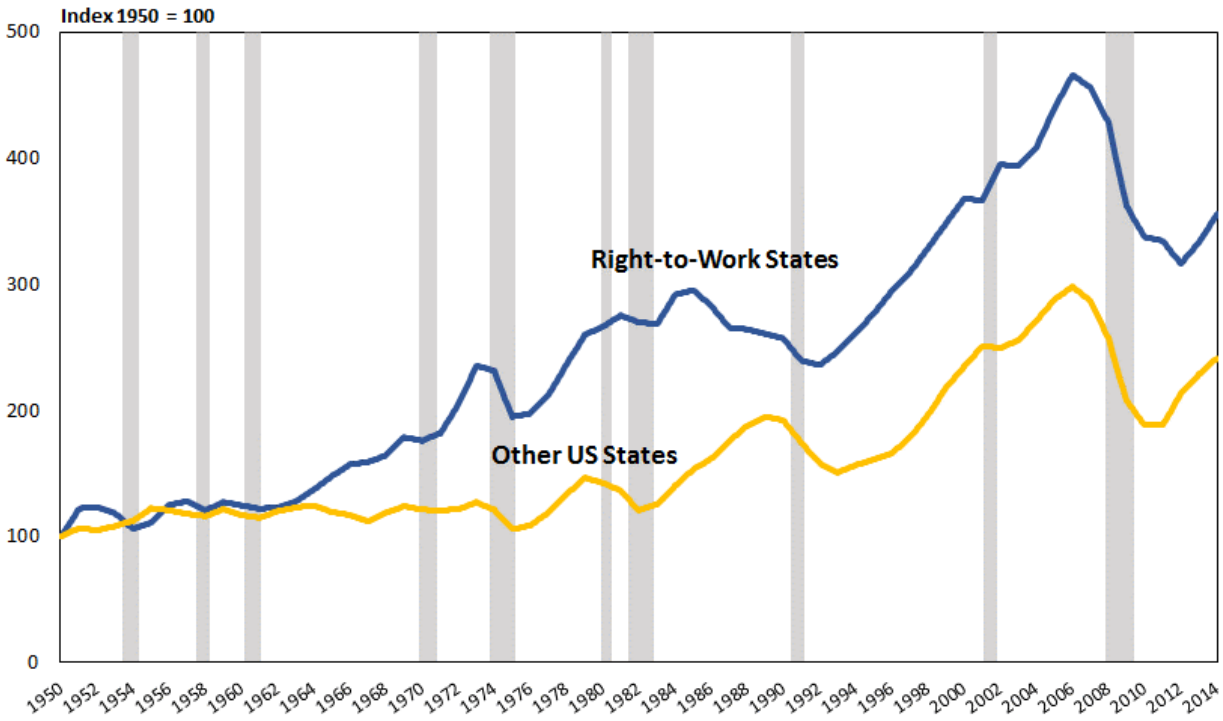


Figure 13: Wage and Salary Income per Job, Manufacturing Sector, RTW States Relative to Other States



With Figure 14 we turn our attention to a second sector where unionization is particularly important: construction. As illustrated, construction employment has grown considerably faster in RTW states over the period of analysis. Overall, construction in 2013 stood around 3.6 times above its 1950 level in RTW states versus around 2.4 times higher in non-RTW states.

Figure 14: Construction Sector Employment



In Figure 15 we report wage and salary rates for the two groups of states for the construction industry. As illustrated, a similar pattern holds in which wage and salary rates in RTW states lags that of the non-RTW states. In Figure 16 we report the ratio of wage and salary income in RTW states compared with non-RTW states over the period of analysis. In a pattern similar to what we observed in the manufacturing sector, wage and salary rates have improved in RTW states relative to other states: wage and salary rates in RTW states grew from nearly 73 percent of such income in non-RTW states in 1969 to nearly 86 percent by 2013.

Figure 15: Annual Wage and Salary Income per Job, Construction Sector

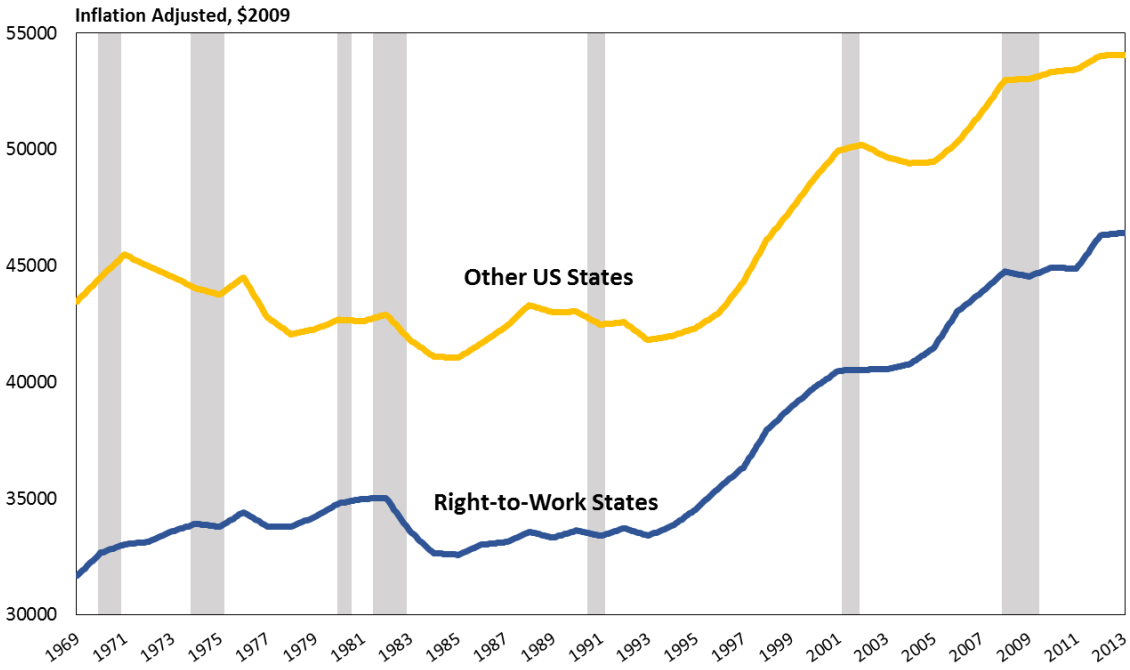
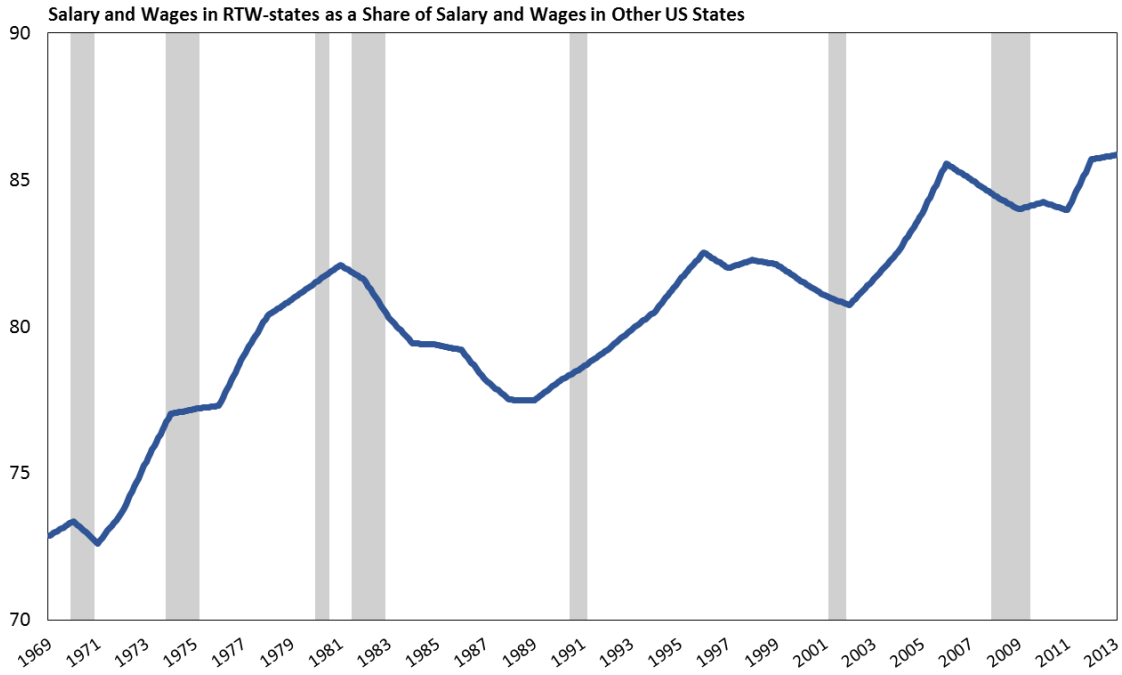
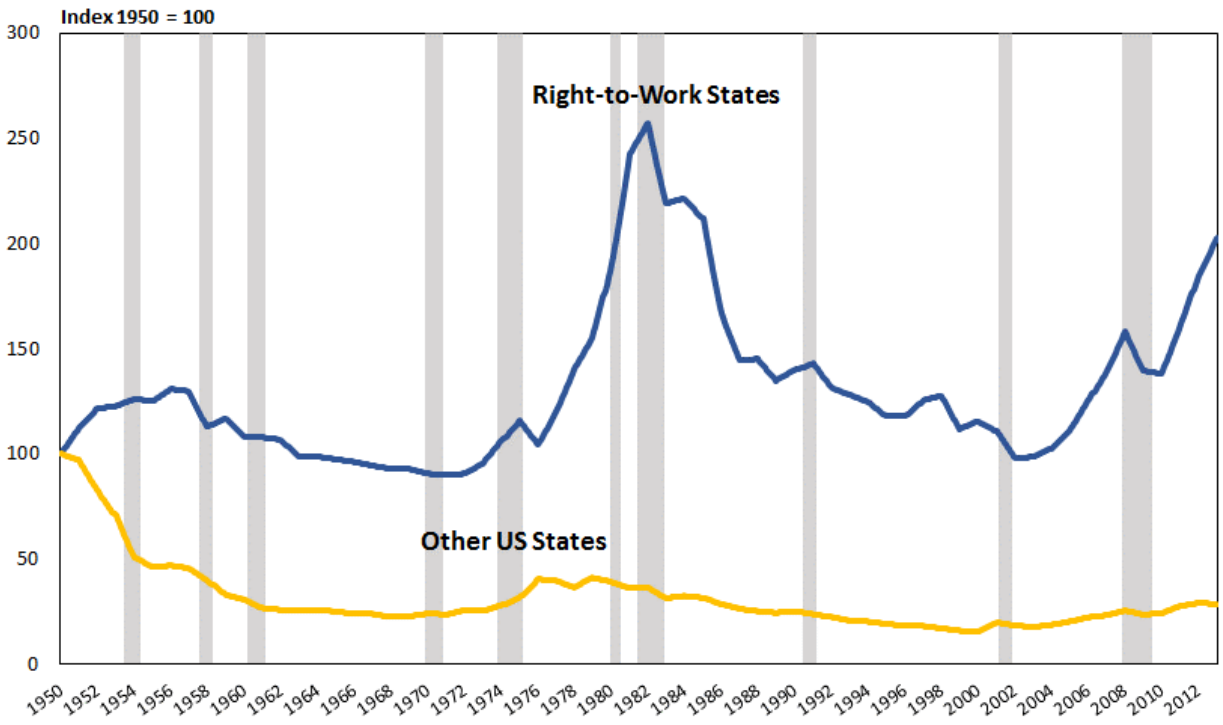


Figure 16: Annual Salary and Wage Income per Job, Construction Sector, RTW States Relative to Other States



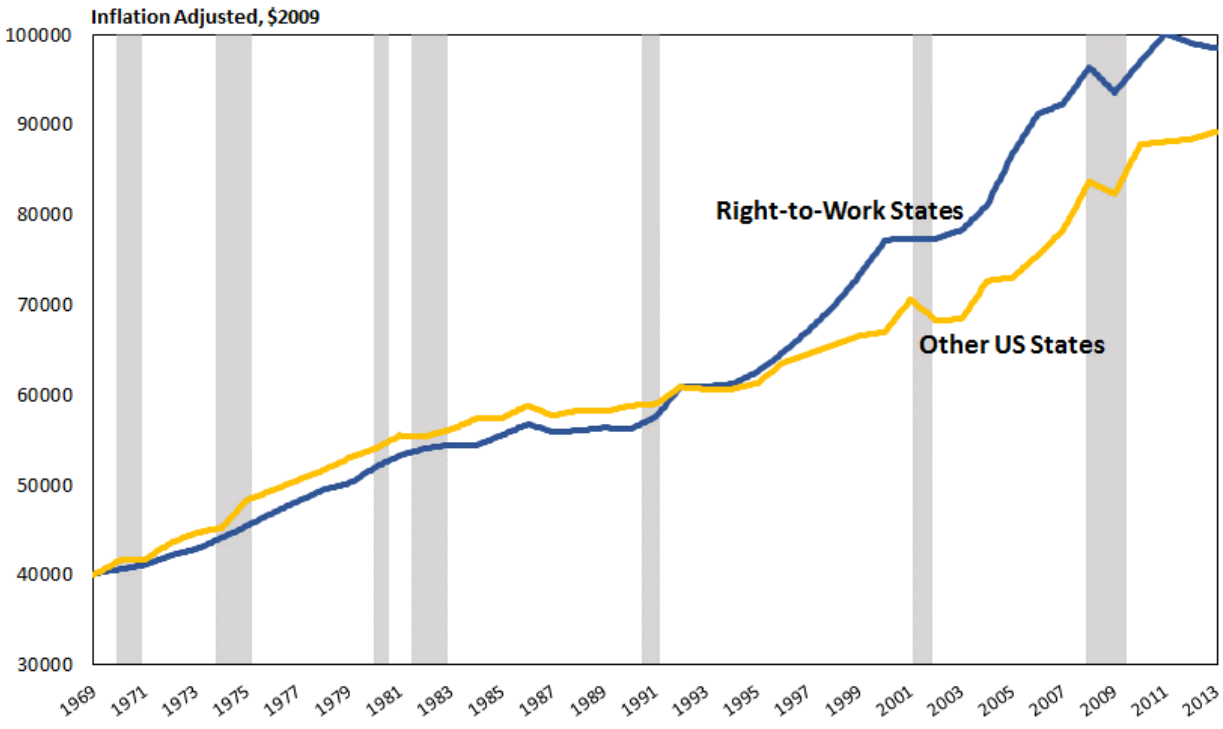
Next we consider a third specific industrial sector of interest: natural resources mining. Here we only examine the 21 states where natural resources and mining output constituted at least one percent of state GDP in 2013. Here we see a picture in which the RTW states have fared far better than other states. In RTW states, mining employment doubled over the period of analysis. In contrast, mining employment in the remaining states fell to about a quarter of its 1950 level by 2013. However, mining employment has been extremely volatile in RTW states.

Figure 17: Natural Resources and Mining Sector Employment



In Figure 18 we report wage and salary rates for the two groups of states for the natural resources and mining sector for the 21 states that have a noticeable amount of activity in the sector. In contrast to the pattern we observed with construction and manufacturing, wage and salary rates have been higher in RTW states compared with other states since the early 1990s in the natural resources and mining sector. Wage and salary rates in RTW states have been between 10 to 20 percent higher than in other states since around 2000.

Figure 18: Annual Wage and Salary Income per Job, Mining Sector



3.4 State-Specific Evolution after RTW Adoption

Next we briefly examine the way in which employment changed in individual state economies after the adoption of that state's RTW policy. In Figure 19, we report the three-year average annual employment growth rate for the 10 states that adopted RTW policy between 1950 and 2011. The green dotted lines indicate the 10-year average annual employment growth rate before the adoption of RTW policy and the 20-year average annual employment growth rate after the adoption of RTW policy. Long-run employment growth was higher after the adoption of RTW policy in five of the states while employment growth was lower after the adoption of RTW policy in the other five states. Overall, it is very difficult to draw any meaningful understanding of how RTW may affect employment growth from such a simple examination of individual state data and without controlling for the numerous other factors that may affect state macroeconomic outcomes. The full and detailed econometric analysis in the next section will provide a much richer and detailed understanding of the true effect of RTW policy.

Figure 19: Average Annual Employment Growth Before and After RTW Adoption

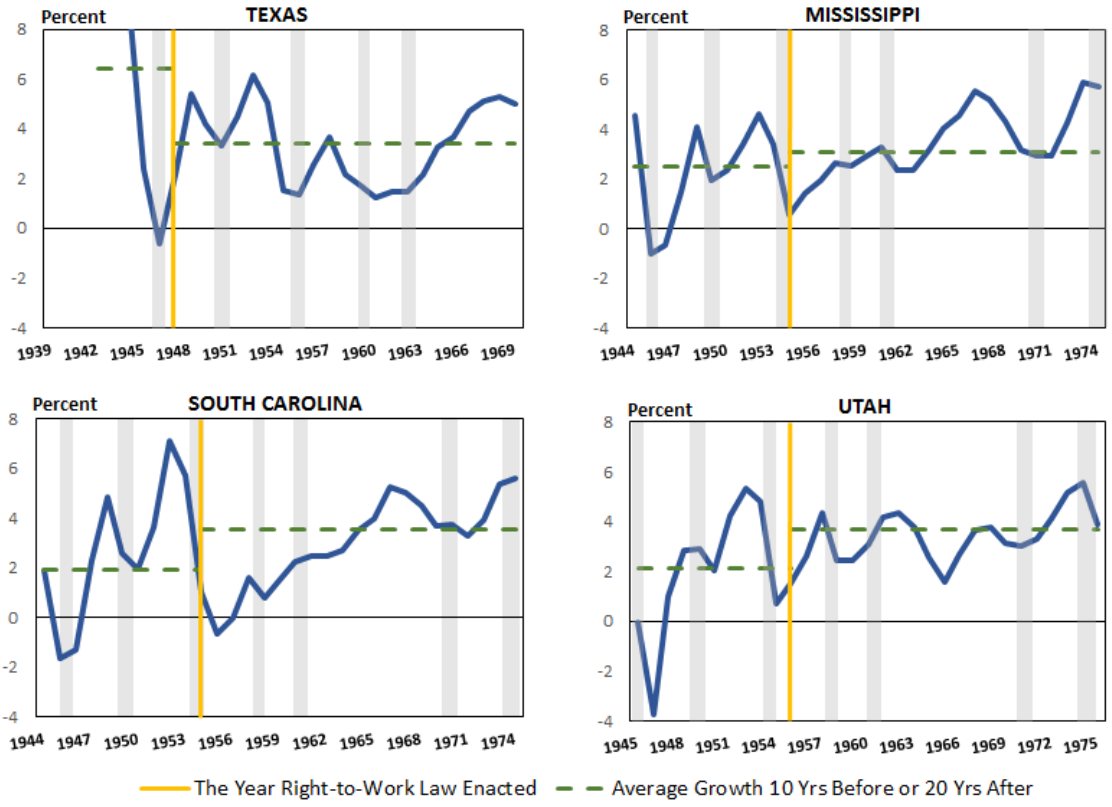
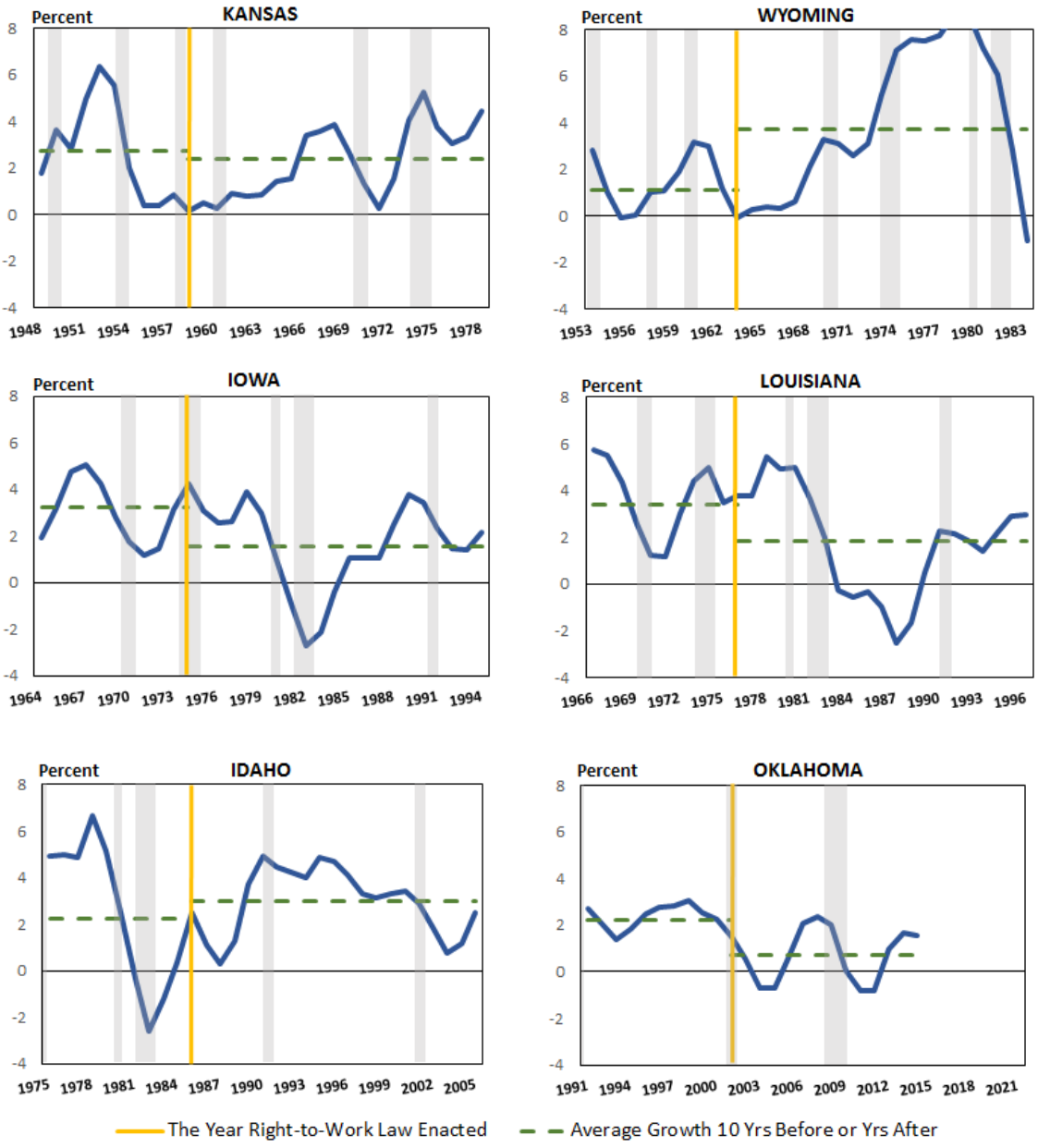


Figure 19 (continued): Average Annual Employment Growth Before and After RTW Adoption



Source: Bureau of Labor Statistics, Current Employment Statistics Survey
Notes: Shaded areas represent recession periods.

4 Regression Analysis

4.1 Data and Methodology

While informative, the analysis presented in Section 3 does not provide a rich understanding as to whether the adoption of RTW policy is simply correlated with the various outcomes depicted above, or whether such policy actually causes variation in union membership, employment, output, and wages. To gain a clearer picture of the causal effect of RTW policy on economic outcomes requires regression analysis. In this section we estimate a series of regression models in which we explain various economic outcomes as a function of whether a state has adopted RTW policy and several other control variables. Our regression models are summarized as:

$$Private\ Sector\ Union\ Rate_{s,t+3} = \alpha + \beta RTW_{s,t} + \theta X_{s,t} + \varepsilon_{s,t}$$

$$Employment\ Growth_{s,t+3} = \alpha + \beta RTW_{s,t} + \theta X_{s,t} + \varepsilon_{s,t}$$

$$GDP\ Growth_{s,t+3} = \alpha + \beta RTW_{s,t} + \theta X_{s,t} + \varepsilon_{s,t}$$

$$Wage\ Growth_{s,t+3} = \alpha + \beta RTW_{s,t} + \theta X_{s,t} + \varepsilon_{s,t}$$

where s and t represent state and year indices, respectively; X represents a set of state-level policies and characteristics that may explain the various economic outcomes being considered and which may be correlated with the adoption of RTW; α is a constant term (or intercept); and ε represents random variation. All models are estimated using a panel of state-level data for the years 1990 through 2010, resulting in 1008 observations (Alaska and Hawaii are excluded from the analysis). We exclude data before 1990 since behavioral patterns that are identified from earlier eras are likely to be less informative for economic policymaking today. Data definitions and source notes are provided in the Appendix. We use a lead specification, so explanatory variables from a given year (t) are paired without outcome variables from three years ahead (t+3), i.e., explanatory variables from 1990 are paired with outcome variables from 1993. As a result of our use of a lead specification, data for our outcome measures are from the years 1993 through 2013. The use of a lead specification is appropriate as RTW policy (or most any public policy) will not affect macroeconomic outcome variables immediately but rather take time to exert an influence. All models include fixed effects to control for unobserved

heterogeneity associated with the year of observation and for the specific region of the county as captured by Census division.

Summary statistics are reported in Table 1. Our primary variable of interest is a dummy variable denoting whether a state has a RTW policy in place. As reported, 44 percent of states had a RTW policy in 1990, and the figure grew to 46 percent by 2010. We consider four alternate outcome variables. We begin by examining unionization, as measured as the share of the private-sector workforce that belongs to a labor union in a given state and year. As reported in the table, our unionization measure falls from an average of 11.7 percent in 1990 to 6.8 percent by 2010. We also consider three macroeconomic outcomes: three-year average annual growth in total employment, three-year average annual growth in GDP, and three-year growth in inflation-adjusted wage and salary income per job.

Table 1: Summary Statistics

	1990		2010	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**
Right to Work	0.44	0.50	0.46	0.50
Union Membership (%)	11.71	4.74	6.84	3.05
Employment Growth (%)	0.99	1.69	1.86	1.03
GDP Growth (%)	5.38	2.09	4.13	2.16
Wage Growth (%)	1.04	0.60	0.62	1.02
Economic Freedom Index	6.43	0.75	6.37	0.68
State & Local Gov. Spending per Capita (000s)	4.34	0.80	11.31	2.07
Mining Share of Employment (%)	2.36	2.34	2.06	2.22
Manufacturing Share of Employment (%)	19.26	6.50	11.16	3.88
Construction Share of Employment (%)	5.83	1.30	5.54	1.33
Unemployment Rate (%)	5.44	1.07	8.80	2.08
College Degree (%)	19.62	3.77	27.44	4.91
Median Income (000s)	43.50	7.08	48.91	7.34
Poverty Rate (%)	13.21	4.23	14.22	3.42
Age 25 - 44 (%)	32.00	1.62	25.93	1.29
Age 45 - 64 (%)	18.53	1.07	26.91	1.80
Age 65+ (%)	12.65	1.78	13.44	1.47
Population Density	170	240	198	263
Cooling Degree Days (000s)	1.10	0.79	1.22	0.80

In our regression analysis we also include a broad set of additional control variables that may also be important in explaining our outcome measures and that may be correlated with the presence of a RTW policy. This set of variables begins with two measures of public policy: We control for a measure of the nature of state tax and regulatory policy by including the Economic Freedom of North America Index,

which broadly captures the degree to which state and local governments intervene in the private sector in US states.[3] The adoption of RTW policy is likely to be correlated with other state policies and, without controlling for the broader policy environment, the effect that we measure on RTW policy may be biased because the estimated coefficient may capture not only the specific effect of RTW policy, but also the effect of related policies that are often in place alongside RTW. The inclusion of this policy index helps avoid this source of bias to more accurately isolate the specific effect of RTW. In a related vein, we control for the overall size of government in a state by including state and local government spending per capita.

Next we include three variables that capture the industrial mix of state economies – the share of total employment that is in the mining, manufacturing, and construction sectors. We choose these sectors for specific attention since union activity is typically more pronounced in these sectors. And as such, relatively more or less economic activity in these sectors may alter the effect of RTW policy.

Last, we include a broad set of socioeconomic variables that relate to broad macroeconomic outcomes. Here we consider the state unemployment rate to capture labor market conditions. Second we include the share of the state's population that holds at least a bachelor's degree, as higher educational attainment is often found to be associated with more favorable macroeconomic outcomes. We include state median income and the state's poverty rate to capture general economic prosperity. We control for the age distribution of the state's population by including three variables that capture the share of the state's population that is between ages 25 and 44, between ages 45 and 64, and over age 65. We include population density to control for the broader geographic profile of the state. Last, we control for a measure of climate, which we term "cooling degree days."[4]

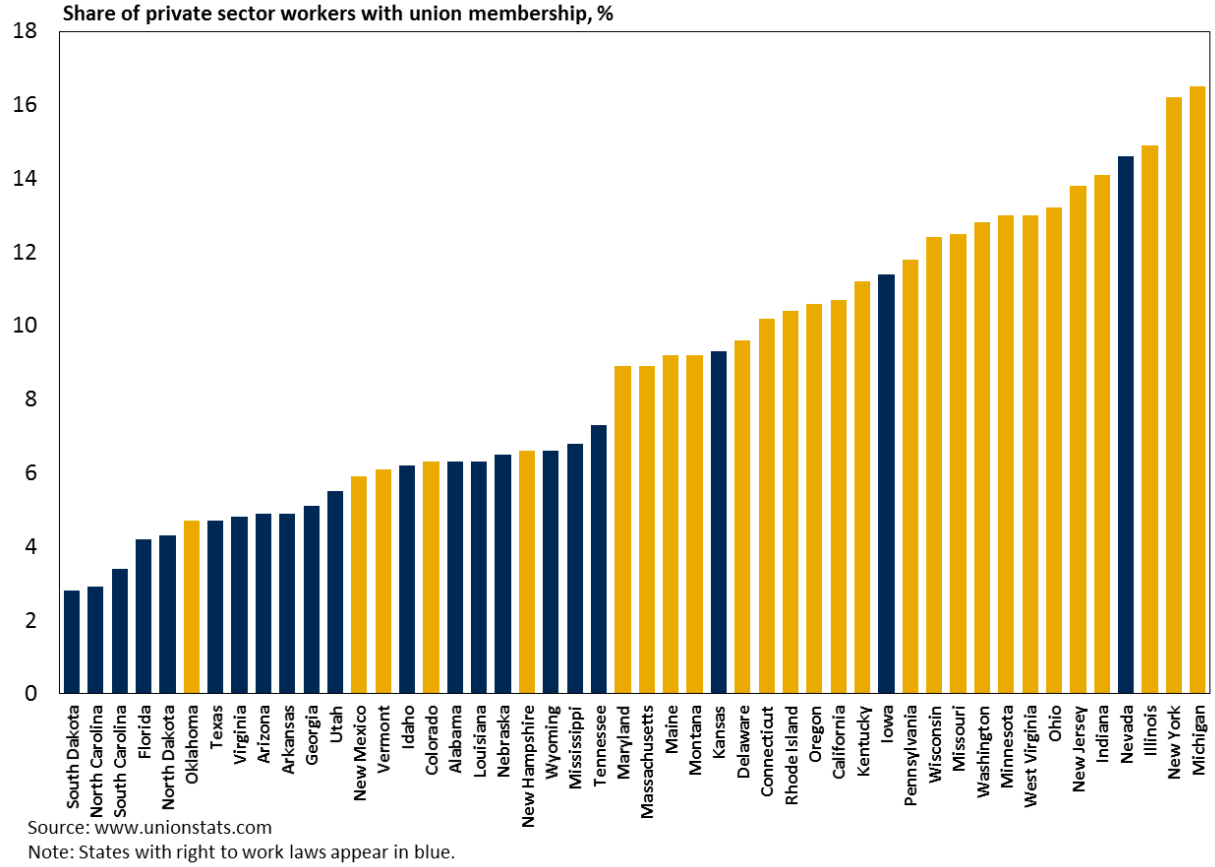
4.2 Regression Results: Union Membership

We now turn to the results of our first series of models in which we estimate the effect of RTW policy on union membership. Before we present our results, in Figure 20 we report union membership for all states for the year 2000, which is the midpoint year of our dataset used in this analysis. We order the

[3] See http://www.freetheworld.com/efna.html for more information on the Economic Freedom of North America Index.
[4] Cooling degree days is defined as the number of days in a state per year where the average daily high exceeds 65 degrees, multiplied by the number of degrees above 65. For example, if a state experiences an average daily high of 75 degrees for each day of the year, then the cooling degree days variable would become 3,650 (10 degrees above 65*365 days).

states from lowest to highest in terms of the rate of private-sector union membership, and the bars are colored based on whether the state had a RTW policy (blue) versus those that did not have such a policy (gold) as of 2000. As illustrated, there is a strong tendency for states that have a RTW policy to have lower rates of union membership.

Figure 20: Union Membership in RTW versus non-RTW states



Source: www.unionstats.com
Note: States with right to work laws appear in blue.

Our full regression results explaining union membership are reported in Table 2. In Column 1 we report results from a parsimonious model in which we only relate RTW policy to union membership. Here we estimate that states with a RTW policy in place have a rate of union membership that is around 4.6 percentage points lower than states without such a policy. This magnitude is roughly consistent with the basic results presented in Figure 2 above. RTW policy is highly statistically significant in explaining union membership rates, but this model only explains around one-third of the variation in union membership (as evidenced by the R-squared of 0.32). However, as stated above, we cannot be sure whether this estimated coefficient represents the causal effect of RTW or whether it simply reflects a correlation between RTW policy and union membership. For example, it may be simply the case that states that adopt RTW policy may also be more likely to have other policies in place that affect union membership.

To correct for this potential source of bias in our estimated effect of RTW, in Column 2 we present results from a model in which we control for the other factors described above (with the exception of our index of economic freedom). Here we estimate that the states with a RTW policy in place have a rate of union membership that is around 2.2 percentage points lower than other states. This reduction is the size of the effect of RTW (in absolute value) is consistent with our reasoning in which we suspected a biased coefficient in the parsimonious results in Column 1. Also note how the explanatory power of the model improves dramatically when controlling for these additional factors; as evidenced by an R-squared of 0.775, the model is able to explain 77.5 percent of the variation in union membership rates across states through the time period 1990 through 2010.

In Column 3, we move on to incorporate the economic freedom index, which captures the degree to which states have adopted market-oriented policies that may be adopted alongside RTW. With the inclusion of all these control variables we are much better able to isolate the specific effect of RTW policy, rather than related polices, and as such, the estimated effect expectedly drops further (in absolute value), to 2.0 (and the estimated effect remains highly statistically significant). Overall, after controlling for a wide variety of economic factors and the broader policy environment, we estimate that RTW policy leads to a reduction in the state-level rate of private-sector union membership of around 2 percentage points. In other words, the rate of union membership is estimated to fall by around one-fifth as the result of the adoption of a RTW policy (based on an average rate of union membership of 10 percent over our entire dataset).

While not the primary focus of our analysis, we do identify important relationships between our other control variables and private-sector union membership in states. States with more state and local spending per capita are estimated to observe higher rates of union membership. Perhaps surprisingly, states with larger employment concentrations in the mining and manufacturing sectors are estimated to see lower rates of union membership. Union membership is also estimated to be higher in states with higher unemployment rates, higher median income, and larger population shares in the 25-44 and 45-64 age brackets (and correspondingly less population under age 25). Union membership is estimated to be lower in states with higher educational attainment and with higher poverty rates.[5]

[5] We also considered the possibility that the effect of RTW policy on union membership may depend on state industrial composition. As such, we investigated model in which we include interaction effects between the RTW measure and the employment composition variables. However, these models did not reveal significant differences in estimated relationship and are therefore omitted for brevity. This also applies to the employment growth results in Table 3 below.

Table 2: Regression Results: Union Membership and Right to Work

Variable	Model 1	Model 2	Model 3
Right to Work	**-4.561** ***	**-2.212** ***	**-2.005** ***
	(0.200)	**(0.217)**	**(0.213)**
Economic Freedom Index	-	-	**-0.766** ***
	-	-	**(0.120)**
State & Local Gov. Spending per Capita (000s)	-	**0.539** ***	**0.429** ***
	-	**(0.076)**	**(0.077)**
Mining Share of Employment (%)	-	**-0.280** ***	**-0.281** ***
	-	**(0.066)**	**(0.062)**
Manufacturing Share of Employment (%)	-	**-0.115** ***	**-0.110** ***
	-	**(0.023)**	**(0.022)**
Construction Share of Employment (%)	-	0.101	0.142
	-	(0.105)	(0.103)
Unemployment Rate (%)	-	**0.662** ***	**0.528** ***
	-	**(0.083)**	**(0.084)**
College Degree (%)	-	**-0.351** ***	**-0.347** ***
	-	**(0.033)**	**(0.031)**
Median Income (thousands)	-	**0.111** ***	**0.138** ***
	-	**(0.023)**	**(0.024)**
Poverty Rate (%)	-	**-0.081** *	**-0.088** **
	-	**(0.038)**	**(0.037)**
Age 25 - 44 (%)	-	**0.452** ***	**0.536** ***
	-	**(0.076)**	**(0.077)**
Age 45 - 64 (%)	-	**0.518** ***	**0.530** ***
	-	**(0.083)**	**(0.080)**
Age 65+ (%)	-	0.049	0.045
	-	(0.080)	(0.080)
Population Density	-	**0.002** ***	**0.002** ***
	-	**(0.000)**	**(0.000)**
Cooling Degree Days (thousands)	-	-0.247	-0.132
	-	(0.161)	(0.161)
Constant	**10.218** ***	**-15.878** ***	**-14.636** ***
	(0.149)	**(3.577)**	**(3.562)**
R-squared	0.320	0.775	0.784

*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Notes: Regressions include year fixed effects and controls for census division.
All models use a lead specification such that dependent variable is year t+3 and right-hand-side variables are for year t.

4.3 Results: Employment Growth

Next we turn to our results relating to RTW policy and employment growth, as reported in Table 3. We follow the same that we used in Table 2 in presenting the results. In Column 1 we report results from a parsimonious model in which we only relate RTW policy to employment growth (and we also control for the level of employment (measured in log form) in time t, as is appropriate in a growth specification). Here we estimate that states with a RTW policy in place observe a rate of employment growth that is around 0.57 percentage points higher than states without such a policy. RTW policy is highly statistically significant in explaining employment growth, but this basic model only explains around 5 percent of the variation in employment growth (as evidenced by the R-squared of 0.051). However, as stated above, we cannot be sure whether this estimated coefficient represents the causal effect of RTW or whether it simply reflects a simple correlation between RTW policy and employment growth.

In Column 2 we present results from a model in which we control for the other factors described above, again, with the exception of our index of economic freedom, and in Column 3 we present results from our full model. In the full model we estimate that the states with a RTW policy in place have a rate of employment growth that is around 0.56 percentage points higher than other states. In this model we also observe a reduction in the size of the effect of RTW, which is consistent with our reasoning in which we suspected a biased coefficient in the parsimonious results in Column 1, however here the drop in the estimated effect is small. Also note how the explanatory power of the model also improves dramatically when controlling for these additional factors; in the model in Column 3 we are now able to explain nearly 78 percent of the variation in employment growth across states through the time period 1990 through 2010.

We identify a few important relationships between our other control variables and employment growth. Results indicate that a higher value for our index of economic freedom is associated with higher rates of employment growth. States with larger employment concentrations in the manufacturing and construction sectors are estimated to see lower rates of employment growth. Higher unemployment rates and larger population share in the over age 65 category are associated with lower rates of employment growth. Warmer climates are associated with significantly higher rates of employment growth.

Table 3: Regression Results: Employment Growth and Right to Work

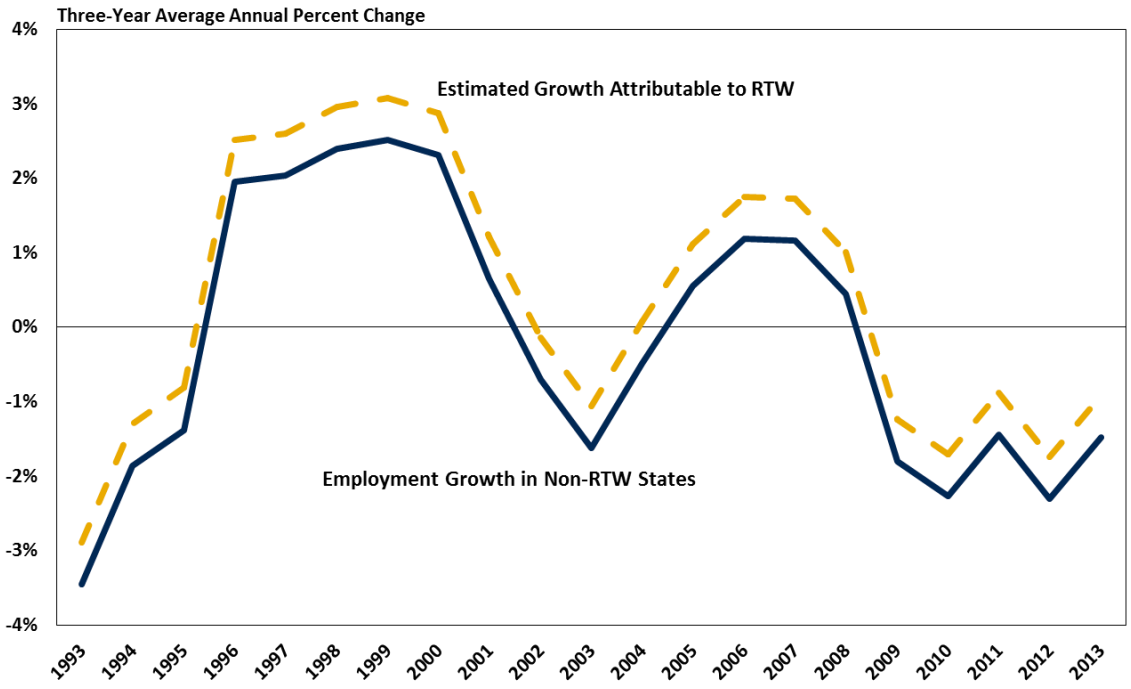
Variable	Model 1	Model 2	Model 3
Right to Work	**0.569** ***	**0.613** ***	**0.564** ***
	(0.126)	**(0.096)**	**(0.097)**
Ln (Employment$_t$)	**-0.310** ***	-0.194	**-0.204** ***
	(0.058)	(0.064)	**(0.064)**
Economic Freedom Index	-	-	**0.181** ***
	-	-	**(0.059)**
State & Local Gov. Spending per Capita (000s)	-	-0.050	-0.023
	-	(0.034)	(0.036)
Mining Share of Employment (%)	-	0.012	0.012
	-	(0.037)	(0.037)
Manufacturing Share of Employment (%)	-	**-0.066** ***	**-0.067** ***
	-	**(0.011)**	**(0.010)**
Construction Share of Employment (%)	-	**-0.407** ***	**-0.419** ***
	-	**(0.056)**	**(0.056)**
Unemployment Rate (%)	-	**-0.163** ***	**-0.130** **
	-	(0.049)	(0.052)
College Degree (%)	-	0.000	0.000
	-	(0.016)	(0.016)
Median Income (thousands)	-	0.007	0.001
	-	(0.011)	(0.011)
Poverty Rate (%)	-	0.001	0.004
	-	(0.021)	(0.021)
Age 25 - 44 (%)	-	-0.030	-0.047
	-	(0.046)	(0.046)
Age 45 - 64 (%)	-	**0.125** ***	**0.121** ***
	-	**(0.039)**	**(0.039)**
Age 65+ (%)	-	**-0.148** ***	**-0.146** ***
	-	**(0.044)**	**(0.044)**
Population Density	-	**-0.001** ***	**-0.001** ***
	-	**(0.000)**	**(0.000)**
Cooling Degree Days (thousands)	-	**0.398** ***	**0.377** ***
	-	**(0.097)**	**(0.096)**
Constant	**5.301** ***	**7.505** ***	**7.217** ***
	(0.827)	**(2.004)**	**(1.998)**
R-squared	0.051	0.777	0.778

*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Notes: Regressions include year fixed effects and controls for census division.
All models use a lead specification such that dependent variable is year t+3 and right-hand-side variables are for year t.

In Figure 21 we graphically depict our estimated effect of RTW policy on employment growth. The blue line reflects actual employment growth for all 48 states in our sample over our entire sample period. The gold line shows the improved rate of employment growth we estimate for states with a RTW policy in place.

Figure 21: Estimated Employment Growth Effect of Right to Work Nationally



4.4 Results: GDP Growth

Now we turn to our results relating to RTW policy and GDP growth, as reported in Table 4. Results from our parsimonious model in Column 1 indicate that states with a RTW policy in place observe a rate of GDP growth that is around 0.61 percentage points higher than states without such a policy. RTW policy is also highly statistically significant in explaining GDP growth, but this basic model only explains a small share of the variation in GDP growth. In the full model presented in Column 3, we estimate that states with a RTW policy in place have a rate of GDP growth that is around 0.68 percentage points higher than other states, controlling for all of the other factors in our model. This estimated effect of RTW policy of 0.68 percentage points should be interpreted relative to an overall average annual rate of GDP growth of 4.7 percent over our entire 1993-2013 period of analysis. In our preferred model we are able to explain around 53 percent of the variation in GDP growth across states across our period of analysis.

Concerning other control variables, results indicate that states with larger employment concentrations in the construction sector see lower rates of GDP growth. Similar to the employment specification, higher unemployment rates are associated with lower rates of GDP growth. Larger population shares in working-age populations are associated with higher rates of GDP growth. Warmer climates are associated with significantly higher rates of GDP growth.

Table 4: Regression Results: GDP Growth and Right to Work

Variable	Model 1	Model 2	Model 3
Right to Work	**0.611 *** **	**0.696 *** **	**0.675 *** **
	(0.157)	**(0.181)**	**(0.178)**
Ln (GSP_t)	**-0.454 *** **	**-0.273 ** **	**-0.283 ** **
	(0.073)	**(0.107)**	**(0.110)**
Economic Freedom Index	-	-	0.079
	-	-	(0.115)
State & Local Gov. Spending per Capita (000s)	-	-0.031	-0.019
	-	(0.062)	(0.069)
Mining Share of Employment (%)	-	0.047	0.047
	-	(0.090)	(0.090)
Manufacturing Share of Employment (%)	-	-0.021	-0.021
	-	(0.017)	(0.017)
Construction Share of Employment (%)	-	**-0.374 *** **	**-0.380 *** **
	-	**(0.092)**	**(0.093)**
Unemployment Rate (%)	-	**-0.398 *** **	**-0.383 *** **
	-	**(0.087)**	**(0.093)**
College Degree (%)	-	0.004	0.004
	-	(0.026)	(0.026)
Median Income (thousands)	-	-0.002	-0.004
	-	(0.020)	(0.021)
Poverty Rate (%)	-	0.014	0.015
	-	(0.042)	(0.042)
Age 25 - 44 (%)	-	**0.137 ***	**0.132 ***
	-	**(0.074)**	**(0.075)**
Age 45 - 64 (%)	-	**0.201 *** **	**0.199 *** **
	-	**(0.068)**	**(0.068)**
Age 65+ (%)	-	-0.113	-0.112
	-	(0.072)	(0.072)
Population Density	-	0.000	0.000
	-	(0.000)	(0.000)
Cooling Degree Days (thousands)	-	**0.447 *** **	**0.440 *** **
	-	**(0.148)**	**(0.147)**
Constant	**10.080 *** **	4.518	4.359
	(0.868)	(3.147)	(3.159)
R-squared	0.061	0.530	0.531

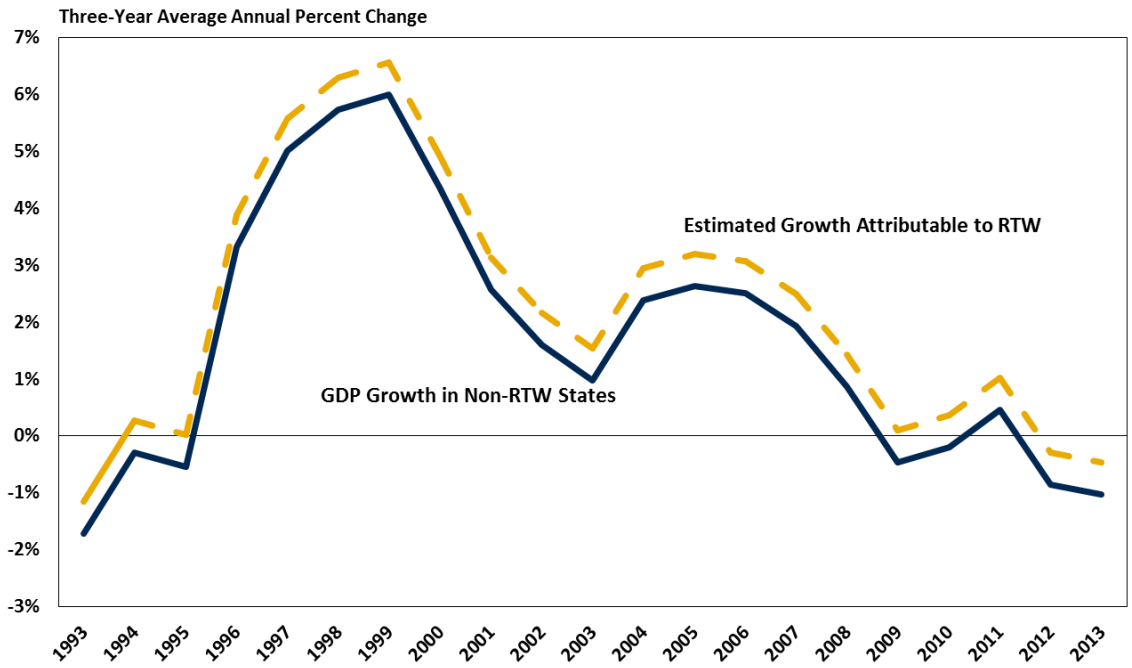
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Notes: Regressions include year fixed effects and controls for census division.

All models use a lead specification such that dependent variable is year t+3 and right-hand-side variables are for year t.

In Figure 22 we graphically depict our estimated effect of RTW policy on GDP growth. As with Figure 21, the blue line reflects actual GDP growth for all 48 states in our sample over our entire sample period. The gold line shows the improved rate of GDP growth we estimate for states with a RTW policy in place.

Figure 22: Estimated GDP Growth Effect of Right to Work Nationally



4.5 Results: Wage and Salary Rate Growth

Results from our fourth outcome variable – the rate of change in real wage and salary rates - are presented in Table 5. Here we are unable to statistically identify a reliable relationship between RTW policy and change in real wage rates in any of the three models. Overall, our model seems to have more difficulty in explaining inflation adjusted wage and salary rate growth, compared with the other three outcomes measures, given the fact that our model of choice (Column 3) is only able to explain 42 percent of the variation in rate of change in inflation-adjusted wage and salary rates across the US states over our period of analysis.

Table 5: Regression Results: Wage and Salary Rate Growth and Right to Work

Variable	Model 1	Model 2	Model 3
Right to Work	-0.083	**0.255 ***	0.153
	(0.086)	**(0.112)**	(0.135)
Ln (Wage$_t$)	**-1.658 *****	**-4.216 ****	**-5.221 *****
	(0.324)	**(1.671)**	**(2.005)**
Economic Freedom Index	-	-	**0.299 ****
	-	-	**(0.137)**
State & Local Gov. Spending per Capita (000s)	-	0.086	**0.157 ***
	-	(0.060)	**(0.086)**
Mining Share of Employment (%)	-	**0.054 ***	**0.055 ***
	-	**(0.033)**	**(0.034)**
Manufacturing Share of Employment (%)	-	-0.002	-0.005
	-	(0.008)	(0.008)
Construction Share of Employment (%)	-	**-0.135 ****	**-0.171 *****
	-	**(0.054)**	**(0.062)**
Unemployment Rate (%)	-	**-0.190 *****	**-0.131 ****
	-	**(0.054)**	**(0.064)**
College Degree (%)	-	**0.029 ***	**0.029 ****
	-	**(0.017)**	**(0.016)**
Median Income (thousands)	-	**0.049 ****	**0.049 ****
	-	**(0.020)**	**(0.020)**
Poverty Rate (%)	-	**0.075 ****	**0.082 *****
	-	**(0.028)**	**(0.029)**
Age 25 - 44 (%)	-	**0.268 *****	**0.266 *****
	-	**(0.065)**	**(0.062)**
Age 45 - 64 (%)	-	**0.089 ****	**0.090 ****
	-	**(0.043)**	**(0.043)**
Age 65+ (%)	-	0.058	0.056
	-	(0.040)	(0.040)
Population Density	-	0.000	0.001
	-	(0.000)	(0.000)
Cooling Degree Days (thousands)	-	0.058	0.054
	-	(0.097)	(0.094)
Constant	**18.810 *****	**31.017 ****	**39.238 ****
	(3.398)	**(14.296)**	**(17.028)**
R-squared	0.038	0.414	0.422

*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Notes: Regressions include year fixed effects and controls for census division.
All models use a lead specification such that dependent variable is year t+3 and right-hand-side variables are for year t.

5 Implications for West Virginia

Overall, based on a careful examination of data from all 48 contiguous US states over the period 1990 through 2013, this research has estimated that RTW policy leads to substantial differences in state-level rates of private-sector union membership, employment growth, and output growth in the long-run. Results fail to identify a statistically reliable relationship between RTW policy and the rate of change in wage and salary rates. No factors have been identified that indicate that the adoption of such policy in West Virginia would lead to patterns that are atypical compared with what has been observed in other states over our timeframe of analysis. Ultimately, this research leads to the conclusion that RTW would lead to a decrease in private-sector union membership, and an increase in employment and output growth in West Virginia in the long-run.

For illustrative purposes, we apply our estimated effect of RTW to anticipated economic growth in West Virginia over the coming decade in Figures 23 and 24. In Figure 23, the blue line shows the actual rate of employment growth observed in West Virginia from 2010 through 2014, along with forecast growth for 2015 through 2027.[6] The figure assumes that RTW policy is adopted in the state beginning in 2017. The solid yellow line reflects our estimated employment growth effect of 0.56 percent associated with RTW in the long-run. The dotted yellow line reflects the transitory period while RTW policy takes its full effect. However, it should be noted that this study only estimates the long-run equilibrium effect, and does not precisely estimate how long or how smooth the transitory period will be. Figure 24 provides the parallel illustration for GDP growth, reflecting the estimated RTW effect of a 0.68 percent annual increase in GDP growth.

[6]Forecast economic growth in Figures 23 and 24 come from the 2016 West Virginia Economic Outlook, published by the West Virginia University Bureau of Business & Economic Research.

Figure 23: Estimated Employment Growth Effect of Right to Work on West Virginia

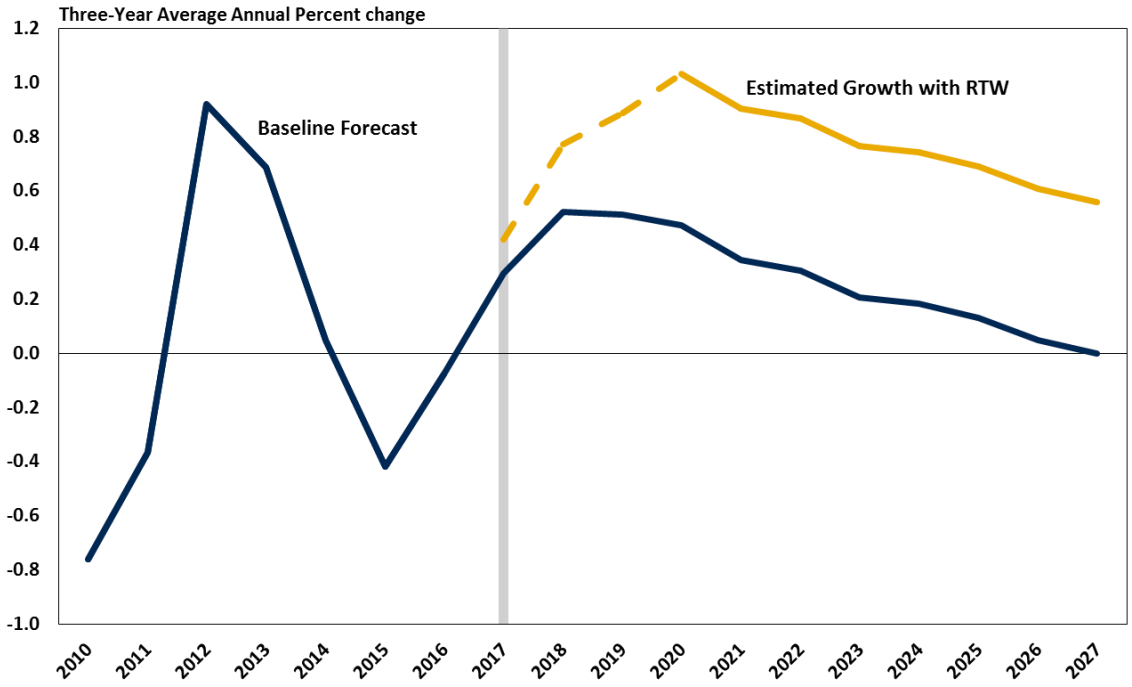
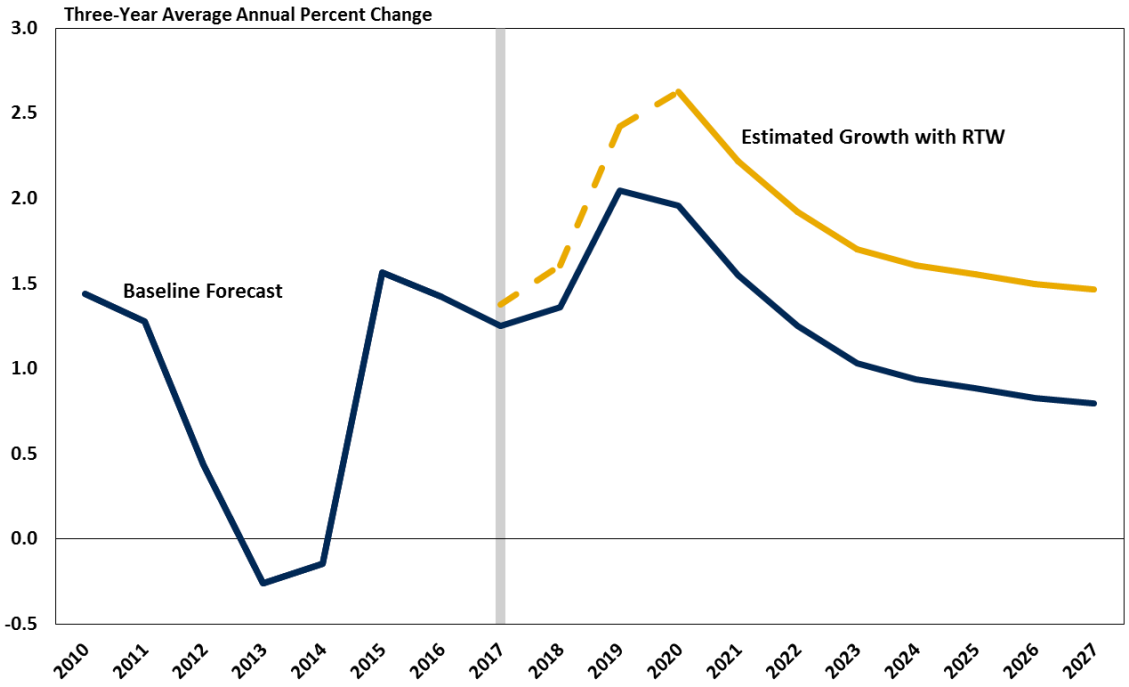


Figure 24: Estimated GDP Growth Effect of Right to Work on West Virginia



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Appendix: Data Definitions and Source Notes

Table 6: Data Sources for Figures

Variable	Definition	Source
Right to Work	Whether a state has a state-level Right to Work policy in place.	Legal Defense Foundation, *Right to Work Laws.* Congressional Research Service, *Right to Work Laws: Legislative Background and Empirical Research* (2014).
Union Membership	Share of private sector workforce that belongs to a labor union, by state.	www.unionstats.org, various years
Employment	Average annual employment by state	*Current Employment Statistics Survey*, US Bureau of Labor Statistics.[7] Sector-specific employment changed from SIC-based classifications to NAICS-based classifications in 2002.[8]
GDP	Gross domestic product, by state.	*GDP by State*, US Bureau of Economic Analysis. Sector-specific GDP statistics changed from SIC-based classifications to NAICS-based classifications in 2002.
Annual Wage and Salary Income	Average annual wage and salary income per job, by state.	Authors' calculation by dividing total wages and salary income (Table SA-7) by wage and salary employment (Table SA-27). Sector-specific wage and salary income statistics changed from SIC-based classifications to NAICS-based classifications in 2002.

[7] Employment data from the Quarterly Census of Employment and Wages is considered by most economists to be the standard for employment data. However, QCEW data became available starting in 1975, and thus could not be used for the historical figures. Instead, we use the Current Employment Survey for the historical figures, because this data has a longer time-series.
[8] The US Bureau of Economic Analysis classifies firms into industries according to their primary business activity using a variety of numeric codes. Prior to 2002, firms were classified under the Standard Industrial Classification (SIC), after which the BEA switched to classifying firms under the North American Industrial Classification System (NAICS). For sector-based employment, GDP, and wages, we use sector classifications based on SIC codes prior to 2001, then switch to NAICS-based classifications for the remainder of the dataset. While data from the two systems of classification exhibit the same trend over time, there are discrepancies between the two datasets..

Table 7: Data Sources for Regression Analysis

Variable	Definition	Source
Right to Work	Whether a state has a state-level Right to Work policy in place.	Legal Defense Foundation, *Right to Work Laws.* Congressional Research Service, *Right to Work Laws: Legislative Background and Empirical Research* (2014).
Union Membership	Share of private sector workforce that belongs to a labor union, by state.	www.unionstats.org, various years
Employment Growth (%)	Year t to t+3 growth rate in total employment, by state.	Authors' calculation based on data from *Quarterly Census of Employment and Wages*, US Bureau of Labor Statistics.
GDP Growth (%)	Year t to t+3 growth rate in total gross domestic product, by state.	Authors' calculations based on data from *GDP by State*, US Bureau of Economic Analysis.
Wage Growth (%)	Year t to t+3 growth rate in average annual wage per worker, by state.	Authors' calculation based on data from *Quarterly Census of Employment and Wages*, US Bureau of Labor Statistics. Wage represents average annual pay per job.
Index of Economic Freedom	A relative measure of business-friendly state policy, by state.	Economic Freedom of North America, various years, freetheworld.com.
State & Local Gov. Spending per Capita	Total spending by state and local governments divided by population, by state.	Authors' calculations based on data from *State and Local Government Finance,* US Census Bureau, various years
Mining Share of Employment (%)	Share of private sector workforce employed in the mining industry, by state.	Authors' calculation based on data from *Quarterly Census of Employment and Wages*, US Bureau of Labor Statistics.
Manufacturing Share of Employment (%)	Share of private sector workforce employed in the manufacturing industry, by state.	Authors' calculation based on data from *Quarterly Census of Employment and Wages*, US Bureau of Labor Statistics.
Construction Share of Employment (%)	Share of private sector workforce employed in the construction industry, by state.	Authors' calculation based on data from *Quarterly Census of Employment and Wages*, US Bureau of Labor Statistics.
Unemployment Rate (%)	State unemployment rate.	*Local Area Unemployment Statistics*, US Bureau of Labor Statistics.
College Degree (%)	Share of state population age 25 and above with a bachelor's degree or higher.	*Current Population Survey,* US Census Bureau, various years.
Median Income (thousands)	State median income.	*Current Population Survey,* US Census Bureau, various years.
Poverty Rate (%)	Percent of state population living below poverty line.	*Current Population Survey,* US Census Bureau, various years.

Variable	Definition	Source
Age 25 - 44 (%)	Share of the state population between the ages of 25 and 44.	Authors' calculations based on data from *Intercensal Population Estimates*, US Census Bureau, various years.
Age 45 - 64 (%)	Share of the state population between the ages of 45 and 64.	Authors' calculations based on data from *Intercensal Population Estimates*, US Census Bureau, various years.
Age 65+ (%)	Share of the state population equal to or over the age of 65.	Authors' calculations based on data from *Intercensal Population Estimates*, US Census Bureau, various years.
Population Density	Population/square miles in a state.	Authors' calculations using on Population data from US Bureau of Economic Analysis and State Land Area data from *Arc-GIS software*, Environmental Systems Research Institute (ESRI).
Cooling Degree Days	Sum of the number of degrees above 65 degrees Fahrenheit in each day of the year, mean by state.	National Weather Service Climate Prediction Center, various years.

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